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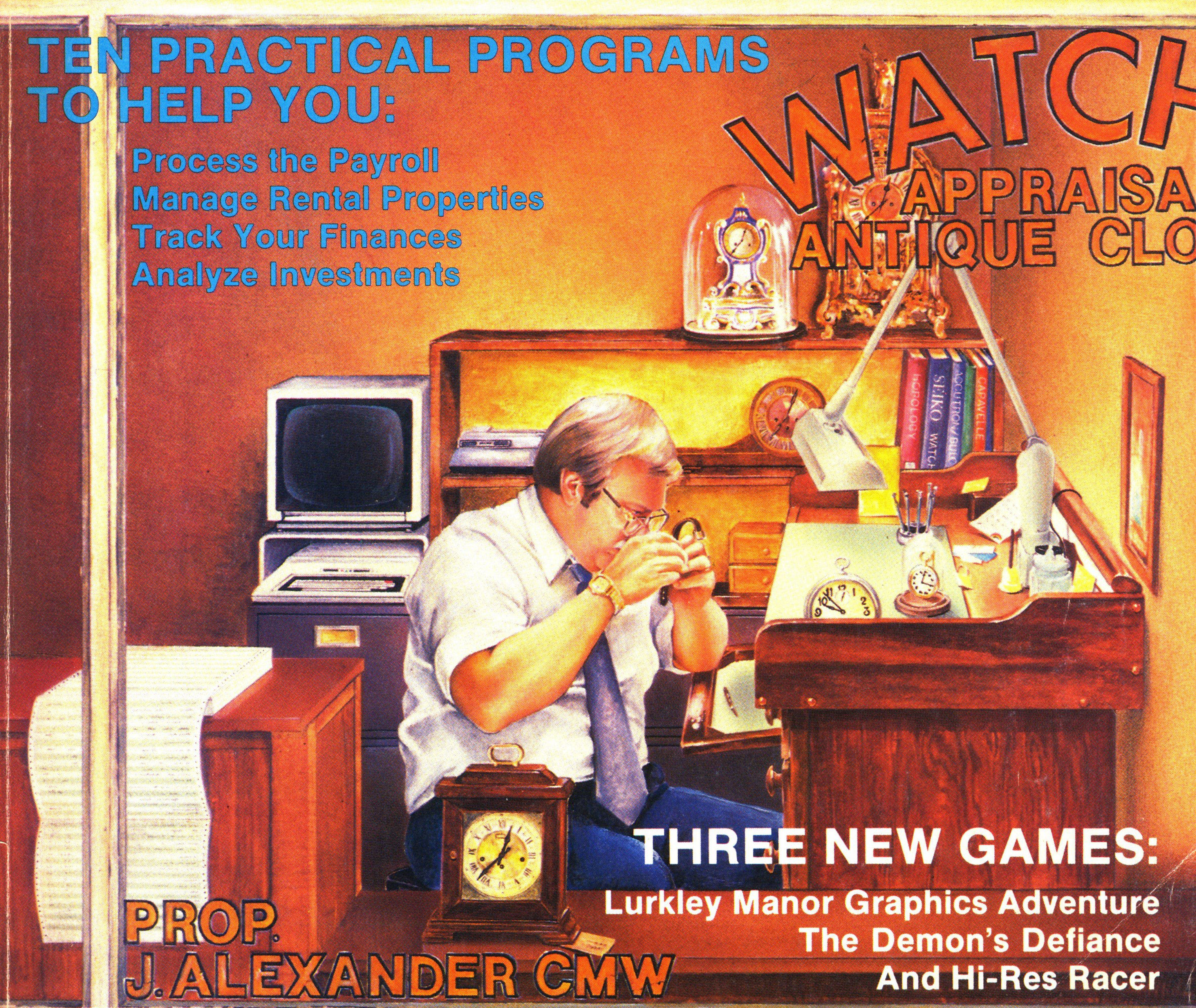
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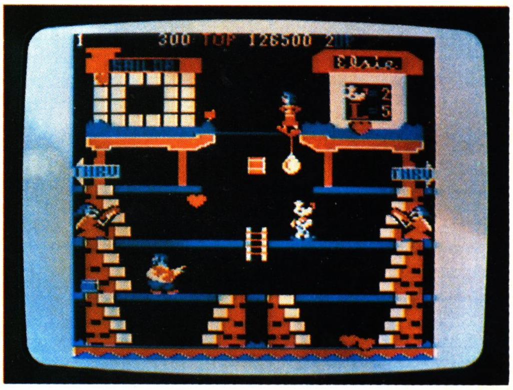

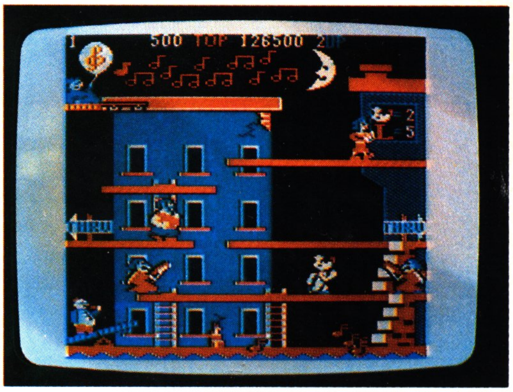

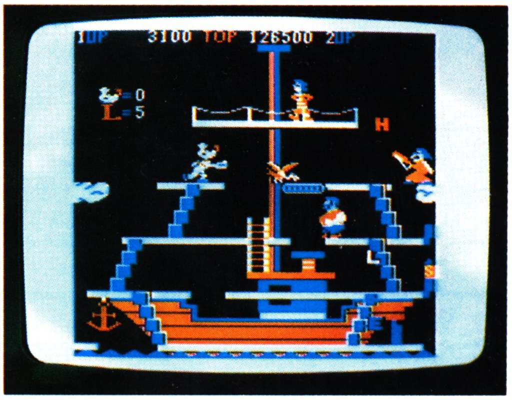

The first screen objective is to catch enough of Elsie's kisses (those Red Heart Shaped Things) to fill in the squares on the Sailorman's house. If you can time your punch just so, you can send the punching bag over to knock the bucket down and, with a little bit of luck, right onto **Bigfatbadguy's** head. This will give you a little (but not much) time to catch all those RHSTs.

You must avoid contact with **Bigfatbadguy** who is actively pursuing you. You must also be careful of **Olduglyseawoman** who will appear at higher difficulty levels to chuck empties at you. Either avoid the flying bottles or punch them (with the fire button) to keep from being knocked into the water.

The second screen objective is to collect enough notes to play Elsie a little love song. You may jump off and onto the other end of **Fatguyeatingahamburger's** teetertotter to fly up a deck and even two decks if you manage to catch hold of **Smartaleckkid's** grab handles. Time it right and away you go.

The Third screen objective is to collect enough letters (thrown by Elsie's cries for H-E-L-P) to complete a ladder all the way to the crow's nest where Elsie is calling you. Beware of the Crow, however, who thinks you are after her eggs!

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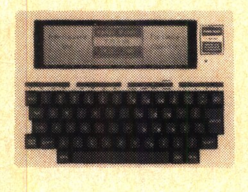

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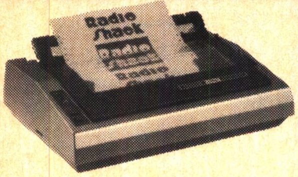

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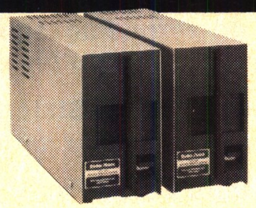

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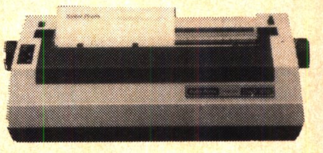

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Under The RAINBOW

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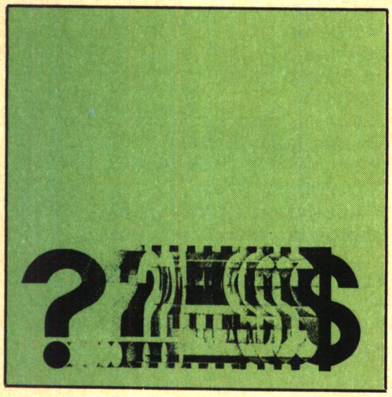

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Cover art© by Fred Crawford

📼 The small cassette tape symbols beside features and regular columns indicate that the program listings with those articles are on this month's RAINBOW ON TAPE, ready to CLOAD and RUN. For full details, check our RAINBOW ON TAPE ad on Page 91.

NEXT MONTH: April is our Simulations issue. Prepare yourself for a Simulations excursion as we reveal the two grand prize winning programs of our second annual contest, and announce the names of the remaining winners. We'll also include games and a program designed for helping you write animated graphics. For hardware hackers, we'll feature such projects as a Color BASIC ROM switch that allows you to install two different versions of Color BASIC into your computer. And, while you're waxing creative on the Adventure you're devising for our third annual Adventure contest, you may want to check out Eric Tilenius' article on Adventuring for hints on how to compose some lively ideas.

Look for THE RAINBOW for the best articles, programs and reviews anywhere on the Color Computer!

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March 1985 Vol. IV No. 8

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LETTERS TO THE RAINBOW

Back One Step — Manually?

Editor:

I am a registered owner of the OS-9 operating system and BASIC09. Recently, I lent my copy of the *BASIC09 Reference Guide* to a friend of mine to let him try to translate the long decimal algorithm listed in the manual. He lost the manual.

Being the gracious, gentlemanly type, he offered to buy a replacement copy. As you may have heard by now, Radio Shack will not issue for sale any BASIC09 reference material without the actual software. Does this mean they want everyone to pay $100 for a replacement manual?

I don't need to go on about the marginal durability of the original manual, or how on a multiuser system one might have a need for more than one manual, or that humans sometimes spill coffee, own paper-eating dogs and have destructive children.

I feel this is a definite step into the past for Tandy. I have experienced nothing but excellent support for my CoCo since its purchase. Now that Tandy is offering excellent, high level software, are they going to return to their previous infamous low-level support? I certainly hope not!

Jim Taylor
Meriden, KS

Editor:

Thank you for forwarding the letter from Jim Taylor and giving us an opportunity to help and comment.

There is a mechanism for purchasing replacement copies of any software manual which is lost or destroyed. It's done on a case-by-case basis, through our Customer Services department in Fort Worth. I'm sorry his local store didn't make him aware of it, but we will take care of his problem from here.

We'd like to be able to furnish replacement manuals freely, but there is a reason why we can't. I don't need to explain the well-publicized problem of "software piracy." Disks are easily copied, and the only thing needed becomes the manual. Understandably, software authors/publishers are cautious about requests for manuals — especially since most of our disks are not copy-protected, for the user's convenience. In an effort to protect the software authors, we have had to tightly control the availability of spare manuals. But, I emphasize, single copies *are* available when legitimately needed.

The industry hasn't decided on the question of multiuser systems or local area networks. Perhaps site licenses, perhaps a fairly high price for additional manuals, perhaps some type of hardware or software "protection." It's not an easy problem, and unfortunately no solution is likely to be acceptable to everyone.

Ed Juge
Director of Market Planning
Radio Shack
Ft. Worth, TX

'GRANTING' A WISH

Editor:

Sometime back I purchased OS-9, BASIC and the C Compiler programs for my CoCo (with two Radio Shack disk drives). The documentation I received with these packages left a great deal to be desired.

It took a number of calls to Fort Worth to learn how to load the BASIC09 program. Now I am trying to use the C Compiler package, and find that the manual tells me nothing about the mechanics of using the two disks that are furnished, i.e., which disk goes in which drive at what point in the program development cycle. Again, I have had to depend on the phone to obtain step-by-step instructions.

During the Civil War, General U.S. Grant kept a colonel on his staff for a single purpose. This colonel was not the smartest of people, and Grant would have him read every order Grant wrote prior to publishing it. Grant believed that if the colonel understood the meaning of the order, then it was safe to send it out, as every member of the command would understand it.

My fondest wish is that people who write manuals for hardware and software would take Grant's lead, and utilize someone such as myself (or Grant's colonel) to test the instructions in the manual prior to its release.

Arthur E. Schmidthans
Marysville, WA

SIGN ON

Editor:

I have a cassette-based upgraded 64K CoCo. I am wondering if there is anyone interested in having a deaf pen pal. I am deaf myself, and have enjoyed using the CoCo since 1982. Please write to me at 30 Lowenthal Road, #2166, 14623-5669.

James Sharer
Rochester, NY

HINTS AND TIPS

Editor:

I look forward to reading your fine magazine every month and I have a programming tip I would like to share with my fellow readers.

If you have made many changes to a program that contains `GOTO`s and `GOSUB`s, type `RENUM nnnnn, nnnnn` where "nnnnn" is any number larger than the last line number of your program. This will give you a UL Error for every `GOTO` and `GOSUB` line that you deleted without changing any line numbers of the present program in memory. Now it is quite easy to fix these deletions because your present `LLIST`ing is still valid. Only after a successful `RENUM nnnnn, nnnnn` should you renumber the program the way you intended.

Richard F. Sganga
Brentwood, NY

MACHINE LANGUAGE TIME-SAVER

Editor:

For those readers who dread typing all those "&H"s in front of the machine language source code, or who don't like converting the code to decimal, here is a time-saver for making and reading data statements in your BASIC program to poke the machine language program into memory.

```
FOR X =(address) to (address)
READ A$
B = VAL (‘‘&H’’ + A$)
POKE X, B
NEXT X
```

Source code is put directly into data statements, resulting in about half of the normally required memory to be used.

Also, could you explain the use of the "speed poke" and its limitations?

Kent Maneth
Manhattan, KS

Editor's Note: The speed-up poke `POKE 65495, 0` switches the CoCo from its normal speed mode into one where the computer runs at twice its normal speed much of the time. In this mode, the SAM (synchronous address multiplexer) chip switches between the two speeds, depending on what operations the 6809 processor is performing. Unfortunately, many CoCos can't run at high speed reliably and many more start to have problems when a disk controller is attached.

I/O DILEMMA SOLVED

Editor:

I recently solved a tape I/O problem that may not be common, but I would like to pass it on in hopes it might help someone else with a similar problem.

I had a long program on tape that developed an I/O problem near the end of the tape, and I had no backup. I disassembled the ROM routine for cassette loads and noted that ROM does a `NEW` when it encounters an I/O. I noted on the cassette counter where the I/O occurred and pressed the Reset button just before reaching the I/O. I peeked the beginning of the program from bytes 25 and 26. In direct mode, I ran a loop from the start of the program through to the end of RAM in which each memory byte was peeked, and the value peeked was converted to a `CHR$` and printed to the screen. When the loop reached the end of the program in memory, I broke the loop and asked for the value of the loop variable. I then poked that value into bytes 27 and 28 (end of program pointer). I then did a `CSAVE`.

This routine allowed me to salvage almost all of the program up to the I/O. I loaded what I had, typed in the missing lines that had been lost due to the I/O, and re-saved.

Of course, the begin and end locations of a program have to be converted into most significant and least significant bytes before poking them into the BASIC pointers 25 through 29.

This procedure saved the program from the dreaded I/O, and was a lot faster than retyping the whole program. Still, it remains the best policy to backup anything you don't want to lose. Hope this is helpful.

Paul N. Despres
West Wareham, MA

SPOOKED BY 'NO GHOSTS'

Editor:

I made many unsuccessful attempts to `CSAVE` the short program entitled *No Ghosts* which appeared on Page 147 in the January 1985 issue of THE RAINBOW.

I finally called the customer service representative at our local Radio Shack Computer Center and he informed me that sometimes a `POKE` command in a program will prevent the program from being saved on tape. He suggested I type the program into the computer and then try putting it on tape without running it first, and it worked.

This is the first time I have ever run into this situation, and thought some of your other readers may have experienced the same problem at one time or another.

I have been receiving THE RAINBOW for over two years and think it is a wonderful magazine.

Dale W. Reed
Massillon, OH

SEVERAL SLEUTH SOLUTIONS

Editor:

In the January 1985 issue of THE RAINBOW [Page 10], Mr. Eric W. Lund asks if anybody knows where to get more evidence in Computerware's *Sam Sleuth* on Level 2. I wrote this Adventure/Simulation for Computerware and may be able to help out. *Sam Sleuth* is set up so every time you try to solve each of the three cases, the program picks randomly from several different possible criminals, clue locations, and so on. The point I'm making is if you find evidence somewhere during one session, that same evidence might not be there the next time you play. The game was created this way so you can play the same cases many times before figuring out all of the possible solutions.

It seems Mr. Lund has figured out the case and is just having trouble proving it. Ask people questions and examine everything (even empty lots!). Even how a person's day has been going can sometimes provide information. Writing down notes about objects on the map included in the instruction booklet may also help out. Good luck!

Steve Hartford
Glendale, CA

THE LONG AND WINDING RIBBON

Editor:

This is just some information that may be of use to one of your writers whose address was not in your magazine. Mr. R. George, IV of Terrace, N.M. ["Letters To Rainbow," December 1984, Page 8.]

I do not have a printer like that described, but I do have the very old Centronics/Radio Shack printer that uses the very long ribbon (the printer is Cat. No. 26-1152 — but I cannot find the ribbon number). The last time I looked, the Computer Store stocked these ribbons in a pack of three. It won't be easy to adapt this ribbon for use in another printer, but at least the ribbon itself should be long enough!

Paulette Grantham
Palo Alto, CA

TAROT HARMFUL?

Editor:

Like everyone else, I am a great lover of THE RAINBOW and the day of its arrival is cause for great excitement. The October 1984 issue, [Page 74], however, contained an article that disturbed me a great deal. I am referring to the *Tarot* program. To some it may seem like a harmless game, but a great many people have fallen under the influence of the Devil just by "playing" with seemingly "harmless" things such as this program.

I have removed the offending program from my copy of the magazine and destroyed it, the only time I have ever cut it. If this comment causes someone to stop and think for a moment before including such things in a future issue, this letter has served its purpose.

I know it's a hard job to try and please everyone all the time and I think you do a good job overall. Keep up the good work!

Charles Brite
Canton, OH

KUDOS

Editor:

I am really enjoying your magazine and especially like the "Personable Pascal" column, Keep that one coming!

Doc M. Pepper
League City, TX

FLATTERY FOR FRED

Editor:

Congratulations to Fred Crawford for his January 1985 RAINBOW cover. It's a classic, with the same feel as a Norman Rockwell. His other covers have been OK; this one is tremendous.

Dean Rector
Knoxville, TN

DISK LIBRARY

Editor:

I have subscribed to THE RAINBOW and RAINBOW ON TAPE for two years. I look forward to each month's issue with great anticipation. THE RAINBOW gives a feeling of belonging to a CoCo Community of users from all over the world.

Recently, I have taken the advice of many letter writers and authors in THE RAINBOW and purchased my first disk drive. Wow! Now only did the speed impress me, but it added a new dimension to my computing. Getting out my old copies of THE RAINBOW, I was very pleased to find I already had a library of disk software at my disposal, and thanks to RAINBOW ON TAPE, ready to run.

RAINBOW, you're the best!

Stephen Duff
Kindersley, Saskatchewan

INFORMATION PLEASE

Editor:

I hope the folks at Tandy appreciate your magazine. I don't know that I would own a CoCo if it weren't for RAINBOW. You show a concern for your readers not seen in other publications. With your reviews, articles, certifications, RAINBOW ON TAPE, plus other services, RAINBOW is an essential peripheral to the Color Computer.

I am a novice CoCo user and would like some advice as to where I can get books or other sources of information on ASCII, machine language, Hex, technical data, etc. Write me at 41 Joe Avenue, 04901.

Larry Jackson
Winslow, ME

POKES, DISKS AND TAXES

Editor:

I would like to ask if anyone knows of a way to use the `POKE 65495,0` with a disk drive. It always crashes when I try to use it.

Also, I would like to know if anyone knows of a good program that will help you fill out your income tax return. Write to me at 7821 Lland Ave., 76116.

Thanks a bunch and keep up the good work.

Chris Young
Fort Worth, TX

PIGGYBACK PREDICAMENT

Editor:

I was really excited about the article on "128K The Easy Way" [December 1984, Page 162]. There is a term in the article I have seen elsewhere with respect to upgrading to 64K and I am not too sure what is meant by it. I am referring to "piggybacking." I guess I just don't know as much as I thought.

In another article in the December issue, there is a reference again to piggybacking. It sounds as if one IC was being soldered to the other IC (i.e., pin 1 to pin 1, pin 2 to pin 2, etc.) then replacing the IC combination in the IC socket. Not being familiar to the days of piggybacking 16K chips, etc., I must admit to not knowing what it is I am being asked to do.

Help, please! Thanks.

Rev. Ted Power
Assiniboia, Saskatchewan

Editor's Note: The way it sounds to you happens to be precisely right. The reference to "piggybacking" is the soldering of one IC to another.

PHYSICIAN'S FRIEND

Editor:

I would like to know if anyone has written patches to the *Telewriter-64* to allow either an auto-repeat function when any key is held down, or a key-beep option.

Also, I would like to know if there are any other physicians who are using their CoCos for small record keeping in their offices.

Write to me at 4944 N. Larkin, 53217. Thank you for your time.

Stephen A. Haughey, M.D.
Whitefish Bay, WI

GAME-MAKER

Editor:

Can anybody tell me where I can get software to make games? The Apple uses the *Arcade Machine*. Any help would be appreciated. Send all information to 816 Belleville Street, 62254. Also, I think your magazine is really great.

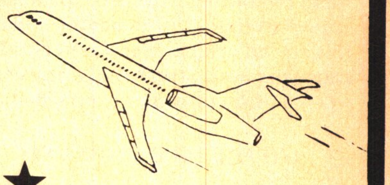
Charles Farris
Lebanon, IL

INTO THE WILD BLUE YONDER

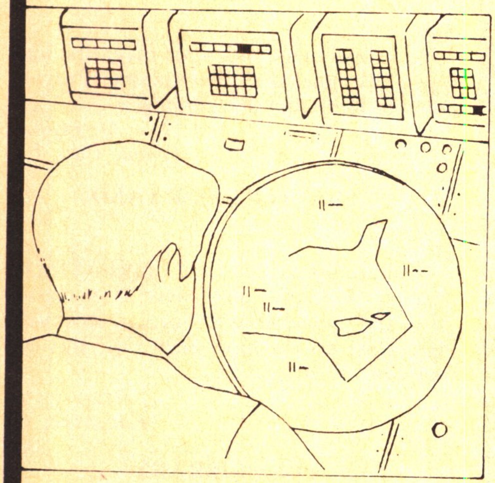
Editor:

I love your magazine and am always excited to see my next issue. I am

Imagine Yourself Positioned At A Radar Console. Aircraft In The Vicinity Of A Major Airport Are On Display, All Awaiting Your Next Command. You Are In Charge. You Are The Controller With The . . .



AIR TRAFFIC CONTROL SIMULATOR ★ ★ ★



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especially interested in flight simulators.

Could you give the names of some of the companies and their flight simulators?

Again, your magazine is the best for my CoCo!

Todd Witter
Chicago, IL

Editor's Note: Check the August 1984 RAINBOW for the article "CoCo Takes Flying Lessons," Page 74. Also, *Worlds of Flight*, by Tom Mix Software (ad on Page 11, January 1985 RAINBOW).

BOUQUETS

Editor:

I want to say a word for Darren Croft of Color Connection Software. From a RAINBOW ad I ordered *The Puzzler* to use for my fifth grade class in Vinalhaven Island, Maine. It would not screen-dump the crossword puzzle to my Pro-writer. After notifying Color Connection, I immediately received a new disk to try and a kind apology from Darren Croft. The new disk worked fine. In 10 minutes I can type in 10-15 vocabulary words with definitions and get a marvelous printout of the puzzle, key and list of definitions to run off on the duplicator. It is an *excellent* device for teachers. I am more than pleased with the way the program works. And, I'm thoroughly pleased with Color Connection Software.

May I say that I find THE RAINBOW more useful in my profession than all the computer periodicals combined that are published for educators. I use five CoCos.

Charles McCabe
Lincoln School
Vinalhaven, ME

A GOOD WORD FOR WORD-PAK

Editor:

After reading the January 1985 "Letters To Rainbow," it occurred to me that I couldn't recall anyone mentioning one of my favorite CoCo peripherals, the PBJ *Word-Pak*. I first learned of it at the 1984 Chicago RAINBOWfest (an exceptionally well-run and worthwhile convention). The *Word-Pak* plugs into the ROM-pack port and provides a true 80-column screen (naturally, this requires a monitor). It is really one fantastic product.

But that is only half of the story. PBJ's ads in THE RAINBOW emphasize the "PBJ support." This is no joke. I had a problem with my *Word-Pak* after I bought it. PBJ's Al Alberta patiently worked with me until it was resolved to my satisfaction. I am not only able to use *Word-Pak* with Radio Shack BASIC, but I also use it with OS-9, and I understand that there is also a driver for FLEX.

I have noticed a few software companies selling programs that are written for use with *Word-Pak*. I hope this trend continues. Now if only my favorite word processor, *Telewriter-64*, would work with *Word-Pak*. How about it Cognitec? I would buy it in a minute!

Tim Feld
West Allis, WI

BULLETIN BOARDS

Editor:

We here at The Great Gamma BBS would like to hear from other CoCo BBS SYSOPS to share ideas. You can either write or leave a message on our BBS at (804) 887-5302. Our address is 16 Embers Lane, 23185.

George Marsh, Jr.
Williamsburg, VA

Editor:

The Singing River Color Computer Club, Inc. is pleased to announce a new 24 hour BBS (601) 875-8688. SYSOP is Larry Corran. Current mailing address is SRCCC, Inc., 3605 Vancleave Road, #118, 39553. We will soon have a newsletter for download.

Mark Welch
Gautier, MS

Editor:

I would like to announce the new number of our TBBS bulletin board system (803) 776-8261. We operate at 300/1200 bps, 24 hours a day, seven days a week. Our SYSOP is Ed Sehlhorst.

Tommy R. Sanders.
Midlands 80 Computer Club
Columbia, SC

Editor:

We are please to announce our BBS Colorama of Yonkers is now online seven days a week, 24 hours a day. Colorama BBS has downloads, boutique, want ads, magazine, graphics, E-mail, and other special features. (914) 965-7600.

Fred Siudym, SYSOP
Yonkers, NY

Editor:

I am pleased to announce a new bulletin board system in Chandler. The CoCo Pub BBS is online 24 hours a day at (602) 899-1350 (voice) and 963-1931 (modem). Our theme is fantasy and science fiction. There is usually some kind of fantasy story being written by the users. We also like to hear reviews of science fiction books, movies, etc.

The CoCo Pub supports messages, downloads (text and programs), CoCo character graphics, bulletins and SYSOP Chat.

Stephen Roberson
Chandler, AZ

Editor:

I would like to inform you of three bulletin boards currently running in the St. Joseph area.

1) Pony Express Systems (816) 232-2320. Online from 9 p.m. to 5 a.m. Mon.-Fri., Sat. and Sun. mornings online until 9 a.m. SYSOP is Rick Drozd.

2) Connection-80 (816) 279-6859, 24 hours, seven days a week. SYSOP is Logan Wing.

3) Info St. Joe (816) 233-2311. Online from 8 p.m. to 8 a.m. daily. SYSOP is Bill Van Vacter.

Rick Drozd
St. Joseph, MO

Editor:

The Color Information Center BBS of Dade County operates at 300 Baud and can be reached 24 hours a day at (305) 751-6809. The C.I.C. BBS runs on an 'E' revision circuit board, 64K modified Color Computer and Hayes 300 Smartmodem with an Epson MX-80/FT printer and three 5¼-inch disk drives running at 40 tracks and 6 ms. step rates for faster access. We feature three mini-boards, public and private mail, a tropical storm/hurricane tracking program and much more.

Our system has been online for five months and we are listed in the XA-4 database of Compuserve's Color SIG.

C.I.C. BBS
Miami, FL

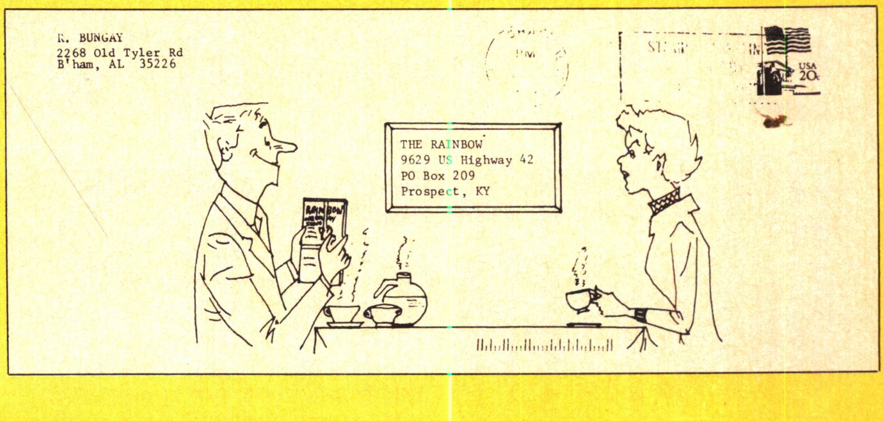
Editor:

I would like to announce a new BBS. Lakehurst Colorama is up and running 24 hours a day. Features include upload, download, message base, magazine section, scoreboard and more. (201) 657-0611.

Richard Bleil
Lakehurst, NJ

The RAINBOW welcomes letters to the editors. Mail should be addressed to: Letters to Rainbow, Falsoft, Inc., 9529 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or space.

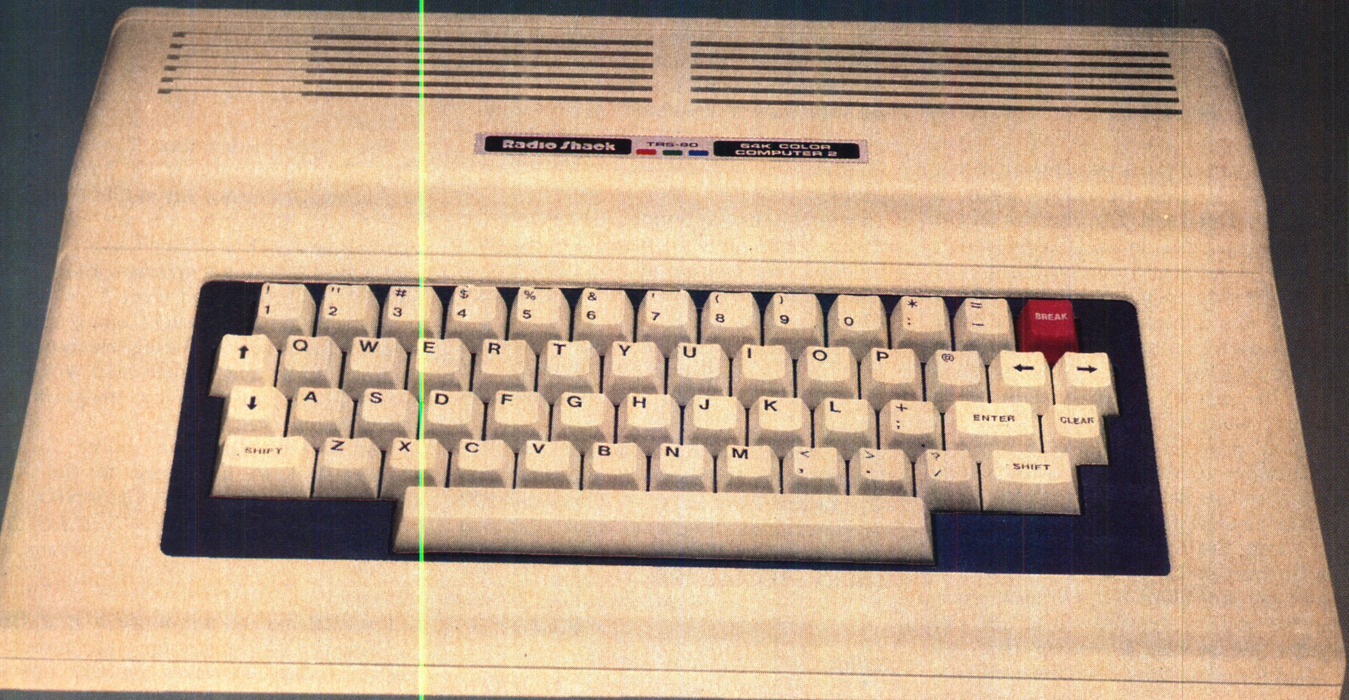
ARTS AND LETTERS



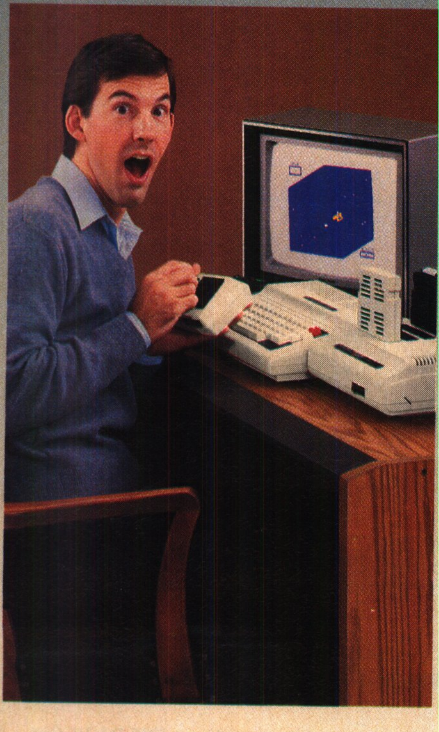
Envelope Of The Month

R. Bungay
Birmingham, AL

SIGHT...



Combine the Color Computer 2 and the new



At $219.95, Our Best Color Computer 2 Has a Lot of People Talking

Radio Shack's most powerful Color Computer 2 has always been a popular topic among computer enthusiasts. Our new low price of $219.95—a savings of $40—makes it an even hotter one. But now there's a new voice in the crowd, because our Color Computer 2 can speak for itself.

Get Sound and Speech for Just $99.95

Add sound effects and up to three voices to your BASIC programs with our Sound/Speech Cartridge (26-3144, $99.95). Put special sound effects in your personal game programs—or create your own stories and animated programs with the computerized voice of a narrator!

Our new cartridge is easy to use and plugs into your computer's Program Pak port or Multi-Pak Interface to add brand new challenges to your home programming. Simple PEEK and POKE commands let you access the Sound/Speech Cartridge for an almost endless number of exciting programming possibilities.

Get a Computer Designed for Serious Programmers

Our 64K Color Computer 2 was designed for the serious programmer—but it's easy enough to use for a beginner to learn on! It's the ideal choice for your family's first venture into computing or for upgrading your present "out-dated" home system for new challenges.

This is no kiddie computer: the 64K Color Computer 2 has enough power and room for expansion to

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Sound/Speech Cartridge and hear what you see

see you through high school, college and beyond. But we've made it easy to start home computing with the Color Computer 2 right away. Just connect it to your TV set and start programming in Extended BASIC (we include an easy-to-use manual to show you how), or choose from our ready-to-run software for games, educational programs and more.

The 64K Color Computer 2 makes it easy to create stunning color graphics with simple one-line commands. For even more challenge, try color animation—or create your own arcade-style games with music and sound effects.

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The Color Computer 2's Extended BASIC also lets you access 32,000 characters of memory right away. Just add a disk drive and operating system and you'll have a full 64K to work with.

Expand Your Computer As Your Needs Grow

Your Color Computer can grow as your needs do. Add a disk drive and you can choose from our large selection of educational, entertainment and professional software. Or add a printer, plotter, modem, joysticks, Color Mouse and more for even greater versatility.

See the Color Computer and Accessories Today

Radio Shack makes it easy to start home computing with the Color Computer 2 and our new Sound/Speech Cartridge. Visit your nearby Radio Shack Computer Center or participating Radio Shack store or dealer today for a hands-on demonstration. Be sure to see all the Color Computer accessories while you're there.

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Prices apply at Radio Shack Computer Centers and at participating Radio Shack stores and dealers. 64K Color Computer 2 (26-3127) was $259.95 in Cat. RSC-12.

PRINT #-2,

You will notice a slightly new look to THE RAINBOW this month. One of the changes is to make your reading and understanding a bit easier.

In most of the articles and tutorials, you will see the keywords and commands that you type into your CoCo in a different style of type — one that looks a lot like the letters that actually appear on the screen.

This is the evolution of a process which began in the early days of THE RAINBOW when, using a dot matrix printer, we used quotation marks to make the commands look a little different. From there, still with the dot matrix printer, we experimented with condensed type and, finally, italic type.

Once we got into typesetting, after our first year, we continued using italic type; this was better because of the typeset quality. We continued that for some time, always looking for something better.

Three months ago, after a lengthy search, we took delivery of a new typesetting system — a digital machine with a hard disk, three terminals, image previewing and other "bells and whistles." One of its specialties was the ability to use a large number of type styles at the same time, whereas before, we were limited to 16 at a time. From among these added possibilities, we chose the digital typeface to designate the commands you type into your computer.

So, now, we have something new. I have always believed the easier we make it to read THE RAINBOW, the better you can use it. This is a step in that direction.

We're taking other steps, too. You will notice some parts of the magazine have undergone what our art department calls a "redesign" in the past few months. Rather than make a big deal out of this, we are just doing it as we go along. The object, of course, is to make it easier for you to read and use THE RAINBOW. For example, you will see that our assembly and BASIC09 listings are done on a daisy wheel printer — because it makes them easier to read.

Look for more changes. And let me know your reaction to them. Some may be subtle, but we think they will help in your overall ability to use THE RAINBOW.

By the way, the change in the way we show commands on our pages will be incorporated in our other magazines, PCM and SOFT SECTOR, as well. Mention of PCM brings me to share some information on a major change in that publication which might be of interest to some of you.

Beginning with last month's issue PCM began coverage of the new Tandy 1000 and Tandy 1200 computers, as well as the Tandy 200 — the new portable. As many of you know, PCM heretofore covered the Tandy 2000 and the Model 100 portable. Of course, our coverage of those two machines continues.

Actually, the 200 is fully compatible with the 100 in BASIC — the language most of PCM's programs are written in, anyway. And the 1000 and 1200 — like the 2000 — are MS-DOS machines, which means much of the BASIC, all of the tutorials and many of the programs we run anyway will work on all three machines. So, we see this expansion as a logical step.

Moreover, we see the 1000, 1200, 2000, 100 and 200 as the "hot" Tandy machines of the latter half of the 1980s. I personally think the 1000 is going to be a "star" in the MS-DOS market. It is a heck of a bargain for the price! You might want to check out PCM.

Over the last half year, I have written a couple of columns on specific subjects — one about the Apple Macintosh and another about the need of new software for the CoCo.

I said that I thought the Mac was an interesting machine, but that its concept was a little difficult to use for any real computing because of the necessity to "switch" back and forth between the mouse and the keyboard. At the time, though, I particularly praised the *MacPaint* graphics program.

On the subject of "new" software, I was talking about the need to develop new kinds of software for the CoCo. Interestingly, there is a new product out for the CoCo that combines those two ideas.

It'll be difficult to miss the ad in THE RAINBOW from Colorware. But what

Telewriter-64™

the Color Computer Word Processor

- **3 display formats: 51/64/85 columns × 24 lines**
- **True lower case characters**
- **User-friendly full-screen editor**
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- **Easy hyphenation**
- **Drives any printer**
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- **No hardware modifications required**

THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

> *...one of the best programs for the Color Computer I have seen...*
> — Color Computer News, Jan. 1982

TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.

The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

FEATURES & SPECIFICATIONS:

Printing and formatting: Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminet, etc).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

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File and I/O Features: ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette auto-retry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

Editing features: Fast, full-screen editor with wordwrap, block copy, block move, block delete, line delete, global search and replace (or delete), wild card search, fast auto-repeat cursor, fast scrolling, cursor up, down, right, left, begin line, end line, top of text, bottom of text; page forward, page backward, align text, tabs, choice of buff or green background, complete error protection, line counter, word counter, space left, current file name, default drive in effect, set line length on screen.

Insert or delete text anywhere on the screen without changing "modes." This fast "free-form" editor provides maximum ease of use. Everything you do appears immediately on the screen in front of you. Commands require only a single key or a single key plus CLEAR.

> *...truly a state of the art word processor... outstanding in every respect.*
> — The RAINBOW, Jan. 1982

PROFESSIONAL WORD PROCESSING

You can no longer afford to be without the power and efficiency word processing brings to everything you write. The TRS-80 Color Computer is the lowest priced micro with the capability for serious word processing. And only Telewriter-64 fully unleashes that capability.

Telewriter-64 costs $49.95 on cassette, $59.95 on disk, and comes complete with over 70 pages of well-written documentation. (The step-by-step tutorial will have your writing with Telewriter-64 in a matter of minutes.)

To order, send check or money order to:

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Or check your local software store. If you have questions, or would like to order by Visa or Mastercard, call us at (619) 755-1258 (weekdays, 8AM-4PM PST). Dealer inquiries invited.

(Add $2 for shipping. Californians add 6% state tax.

Now available at Radio Shack stores via express order

Apple II is a trademark of Apple Computer, Inc.; Atari is a trademark of Atari, Inc.; TRS-80 is a trademark of Tandy Corp; MX-80 is a trademark of Epson America, Inc.

we have is a *MacPaint*-type program running on the CoCo. It appears to combine the best of two systems in a very nice package.

This is the kind of innovation that will keep the CoCo market a healthy one. For those of you in the software business — or interested in getting into it — look at new ideas, not old ones. After all, that's what using computers is really all about — innovation.

Finally, another short story. Obviously, we have a huge number of computers here, and one of the big problems is in keeping the screens clean. While out eating the other night, the restaurant gave me something called a "Wet-Nap" to clean my hands. I asked for another, took it back to the office, and cleaned a screen with it.

It worked really well. Got a lot of dirt, grit and junk off the screen. And, it wasn't so wet that it "ran" down the screen and into the monitor. So, I asked Marianne Booth to call the company and order a few hundred of them for everyone here.

The company will sell to anyone, but their minimum is 10,000. That's a lot of dirty screens. I figure we have enough to clean every computer screen here well past "The Year We Make Contact — 2010."

— Lonnie Falk

FOR THE COLOR COMPUTER FROM

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"THE ANIMATOR certainly is a one-of-a-kind package; I've never seen something like this on any other home computer ...a very good buy for the CoCo." - **Ed Ellers, RAINBOW Technical Writer**

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ANIMATOR JR. - a simplified version in semigraphics. 16 cels, 500 frames (1.5 min. +). Animation can be called from your own BASIC program! 16K/EXT. $16

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Kids 7 & up can write graphics programs! Program an imaginary robot to draw graphics. CLONE multiple robots; TEACH the robot your own commands! Develops problem-solving skills; makes math & geometric concepts come alive! Doodle Mode for easy experimentation. 16 & 32K/EXT. CASS. $18

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Children 3 & up learn letters & numbers. Each correct response adds another animated part to a smiling, dancing centipede. 16K/EXT. CASS. $18

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TEN (10) USER-DEFINABLE FUNCTION KEYS ● TYPE-AHEAD BUFFER ● NON-DESTRUCTIVE CURSOR ● INPUT EDITOR ● AUTO-REPEAT KEYS ● ENHANCED EDITING ● KEY CLICK ● LAST COMMAND RECALL ● BREAK KEY ON/OFF CONTROL ● ON BREAK GOTO ● ON RESET GOTO ● CONTROLLABLE BASIC INPUT ROUTINE ● COMMAND TO SAVE FUNCTION KEYS

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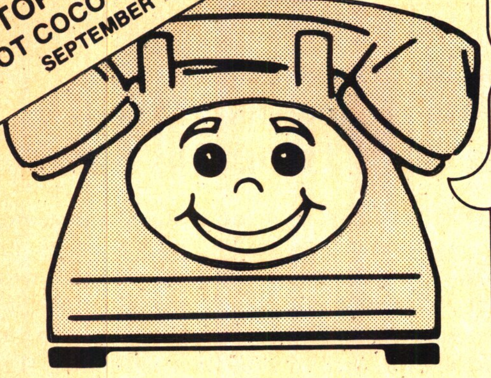
VIDTRON

TOP RATINGS
HOT COCO MAGAZINE
SEPTEMBER 1984



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BUILDING MARCH'S RAINBOW

A Magazine's Heart is Its Printer . . . Comments on Dot Matrix and Daisy Wheel . . . And, Announcing a New Typography Style . . .

One of THE RAINBOW's stalwart veterans made a quiet, unceremonious exit a few weeks ago. As I reflect on it, I'm glad I wasn't present when the old workhorse's harness was slipped off and she was sent out to pasture in favor of a prancing new colt which promises to run twice as fast and with more grace and style than the old lady was ever able to muster up. Yes, I'm glad someone less sentimental than me pulled the plug on our Epson MX-80 F/T.

Call it maudlin if you will, but I'm the sort who finds it difficult to say goodbye to the old family car when trading time comes around. The same thing goes for anything else which through time and experience I've grown to know and trust. Give me old boots, old jeans, old dogs and old machines. No, we didn't have a pet name for the old Epson, but she was a trusted friend and, from the day she arrived, was used to print virtually every listing appearing in THE RAINBOW until her retirement. Her record of service was unblemished and I'd gladly provide a testimonial if she should be nominated for the dot matrix hall of fame.

Well, the new printer is also an Epson — the Epson FX-80 — and it already shows bright promise. But, until it proves itself, it's still an "it" and has no staunch advocate. So, this means we're in a period in which we can challenge the Epson's territory. Toward that end, you may have noticed that our machine language listings are now being done with one of our daisy wheel printers. We think it's such an improvement that now we're considering doing all of our listings on a daisy wheel printer. This clearer "correspondence quality" printing becomes even more important if we elect to go to three-column listings, such as the trial balloon listing on pages 44 through 53. But, then, it should also tidy up things even if used with our present two-column format (compare pages 80 and 81). What do you think?

Why have we stuck with the dot matrix printouts? Well, we feel it's what most of our readers are accustomed to seeing since the majority of you who have printers have the dot matrix type. We believe using a familiar type style enhances readability and helps you when you're comparing your printout to ours. It's the same sort of logic we follow in making our listings 32 characters wide — the same width the lines appear on the screen; it facilitates comparison of your listing to ours. In fact, many clever readers print out their freshly-typed-in listings at a 32-character line width and then overlay their printout right on top of THE RAINBOW page, a very handy way to spot differences when debugging!

Clearly, though, daisy wheel printouts improve the overall appearance of the magazine and, since they have much better definition, may be easier on the eyes, too. Perhaps we should retire the new Epson before the new even wears off. Maybe we'll experiment around a bit and get your reaction.

Along these same lines, we hope you like our new "digital" font we're using in the text of articles whenever BASIC command words, such as CLOAD, LIST and GOSUB, are used. We think it's helpful — especially to beginners — for us to set these words apart, and we feel the digital type style does this with less distraction than our previous practice of putting BASIC commands in all capitals and italics (for example, *LLIST*). We hope you agree it gives a better "flow" to the text lines. Enhancing readability is what it's all about.

Since this is our business and finance issue, here's an investment tip: Enter a year's subscription to THE RAINBOW and you'll save both time and money, and enhance readability, too, by ensuring that each month there's a RAINBOW with your name on it.

— Jim Reed

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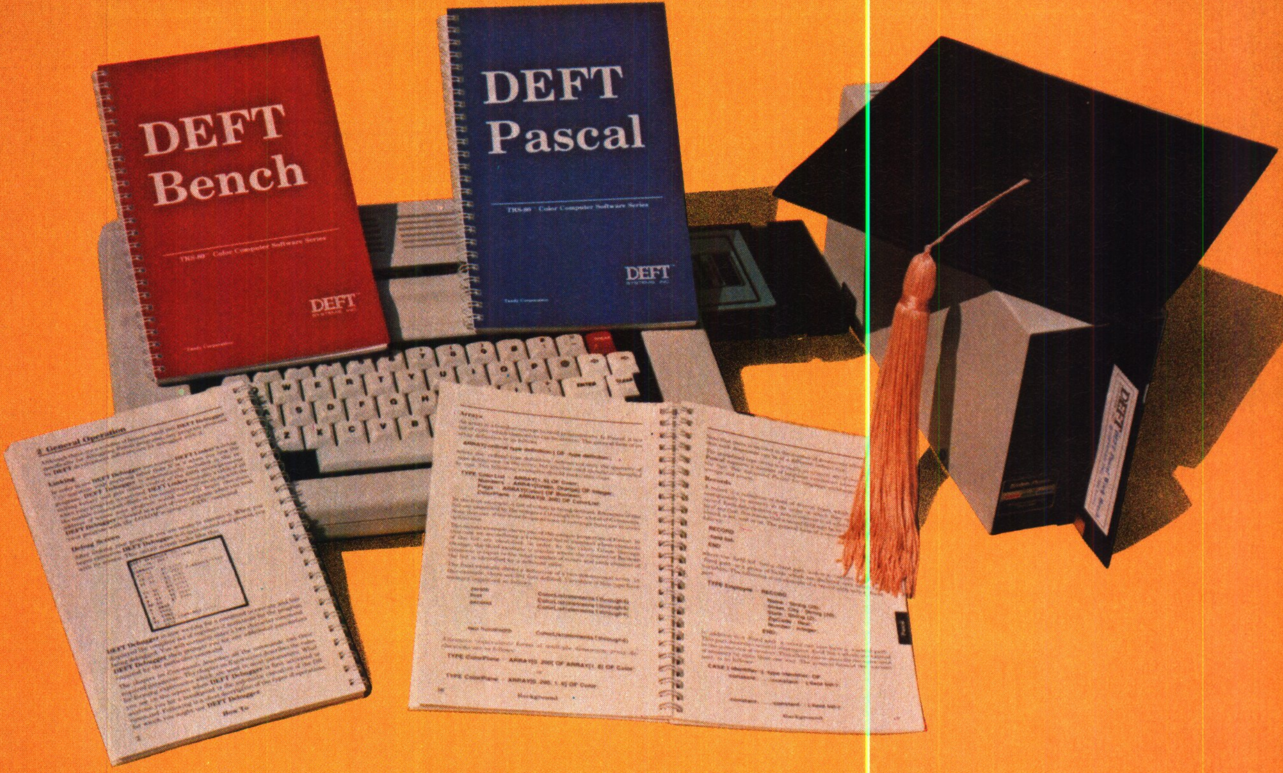
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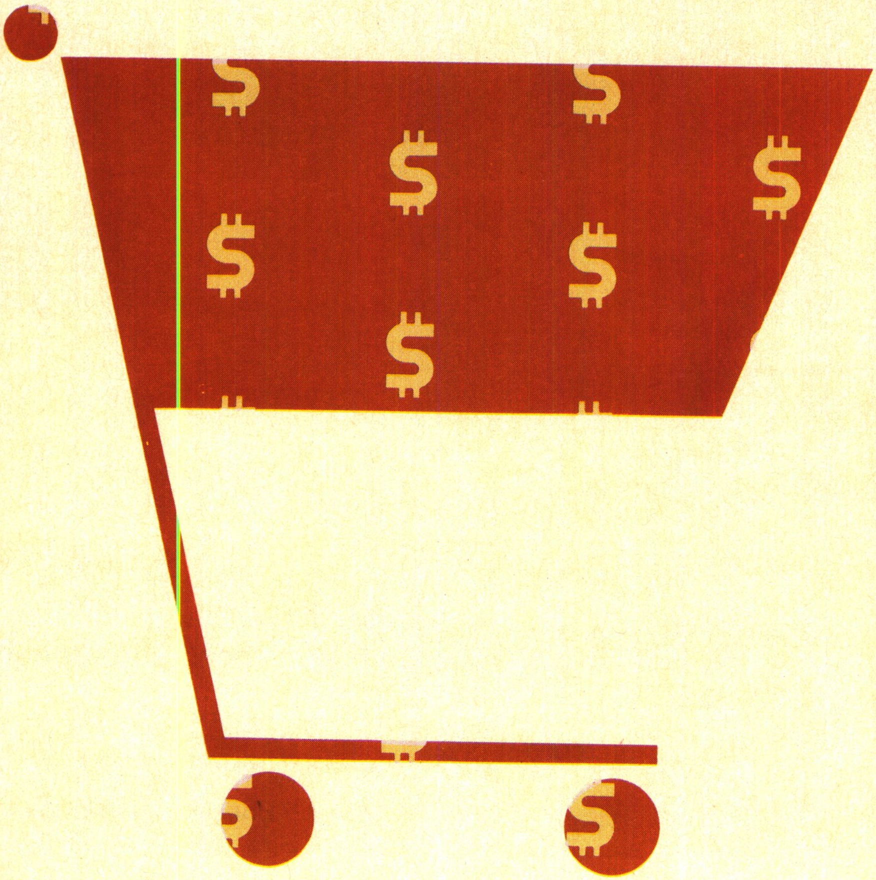

Finding The
Ultimate Bargain
By Paul Myers

The following program is an example of an operational research (also known as scientific management) technique. Its purpose is to identify the most economic quantity for any type of stock that is relatively steady in its consumption,

(Paul Myers is a programmer/analyst for Technicon Corp. His nine years of data processing experience include working with both large scale and mini-computer systems.)

and does not have a short shelf life. For example, although you may know your family consumes five dozen eggs a month, you wouldn't want to buy a whole year's supply at once, even at a bargain price; the eggs have a very short shelf life.

Again from the kitchen, here is a good example of how *EOQ Calc* could be put to use. Let's say your restaurant serves about 1,000 cans of corn a year. Since canned goods have a fairly long shelf life, this program could be used to determine how many cans should be purchased at one time in order to spend the least amount of money annually.

The heart of the program is the following formula.

$$\sqrt{\frac{2 * AU * OC}{(HC * UC)}}$$

AU = Annual Usage
OC = Order Cost
HC = Stock Holding Cost
UC = Unit Cost

The Annual Usage value represents the total amount of a product used in one year. Unit Cost is how much it costs to buy one of the product. The Order Cost represents several costs involved with placing an order.

If you are placing an order for a company of some kind, there is a cost involved with processing the paper work. The more people who must handle this purchase order before it is approved, the higher this cost becomes. The Order Cost also should include any shipping charges the order may incur.

And finally, once the order arrives at the company's facility, someone must receive it, which usually takes still more paper work and handling.

You may think if we were dealing with a situation such as a housewife doing her shopping, this cost would be nothing. Not true! There are two basic expenses that come quickly to mind. If she drives, there is an expense for the gasoline, and possibly parking fees. Plus, while she is shopping, she cannot be doing any other work. There is cost involved with her valuable time. If you were paying a maid to do it, you'd see the expenses more easily

The last variable, Stock Holding Cost, is the catch-all for all of those hidden expenses for storing merchandise. Some examples:

While your money is tied up in stock, it can't be earning interest in a bank. That's costing you money you could be making. There is a cost involved with keeping up a building, usually referred to as overhead. If you didn't need to store products, you would require less space. Therefore, you would be able to get by with a smaller building, which would probably cost you less money to maintain.

The Stock Holding Cost in this formula represents a percentage of these upkeep costs that each product must bear. Generally speaking, this figure will fall somewhere between 10 to 50 percent. This would depend on what proportion of the building is used to store materials.

Using the Program

The following keys are available for your use.

Up-Arrow
Down-Arrow
Left-Arrow
ENTER Key
@ Key

After you have CLOADed the program, type RUN and press ENTER. A question mark will appear in the left-hand side of the field where the next input will be placed. After you have pressed the proper numbers, pressing the ENTER key will accept the value and move you to the next field.

If you make a mistake while entering a number, press the left-arrow and it will clear what has been typed. If you wish to skip up or down without changing the value at the current position, use the corresponding arrow key.

When you are ready to perform the calculation, press the '@' key. The values will remain as you selected them after the calculation is complete. This will allow you to experiment with changing one field or another without needing to retype all of the values again. Also, *EOQ Calc* will not allow you to calculate if any of the values are zero.

One final note about the program. I did not wish to use the SQR (square root) function since it is not available on a 4K system. For those of you who do have a system with Extended BASIC, you may wish to replace lines 590 through 650 with

```
590 EO=INT(SQR(OW)*10+.5)/10
```

This should help speed up the calculation function.

170 37
420 208
590 213
END 52

The listing:

```
10 'E.O.Q. CALCULATOR
20 'BY PAUL MYERS 1984
30 FOR X=1024 TO 1279
40 POKE X,128:POKE 1535-(X-1024)
,128
50 NEXT X:B$=CHR$(128):C$=CHR$(1
30)
60 PRINT@5,"economic"+B$+"order"
+B$+"quantity";
70 PRINT@44,"calculator";
80 PRINT@97,"annual"+B$+"usage";
90 PRINT@129,"unit"+B$+"cost";
100 PRINT@161,"order"+B$+"overhe
ad"+B$+"cost";
110 PRINT@194,"includes"+B$+"cos
t"+B$+"of"+B$+"handling";
120 PRINT@226,"paper"+B$+"work"+
C$+B$+"shipping"+B$+"charges"+C$
;
130 PRINT@258,"and"+B$+"delivery
"+B$+"handling";
140 PRINT@289,"stock"+B$+"holdin
g"+B$+"cost";
150 PRINT@322,"includes"+B$+"cos
t"+B$+"of"+B$+"tying"+B$+"up";
160 PRINT@354,"capital"+B$+"in"+
B$+"stock"+C$+B$+"and"+B$+"stora
ge";
170 PRINT@386,"costs"+B$+"(perce
ntage)";
180 PRINT@449,"e"+B$+"o"+B$+"q";
190 PRINT@118,"         ";
200 PRINT@150,"         ";
210 PRINT@182,"         ";
220 PRINT@310,"         ";
230 P=118:GOSUB 700
240 IF I$<>CHR$(13) THEN WO$=STR
$(AU)
250 AU=INT(VAL(WO$)+.5)
260 X=9-LEN(STR$(AU))
270 FOR Z=0 TO X:PRINT@118+Z,CHR
$(143);:NEXT Z
280 PRINT@118+Z-1,AU;:PRINT@127,
B$;
290 IF I$=CHR$(94) THEN 490
300 IF I$="@" THEN 580
310 P=150:GOSUB 700
320 IF I$<>CHR$(13) THEN WO$=STR
$(UC)
330 UC=INT(VAL(WO$)*100+.5)/100
340 X=9-LEN(STR$(UC))
350 FOR Z=0 TO X:PRINT@150+Z,CHR
$(143);:NEXT Z
360 PRINT@150+Z-1,UC;:PRINT@159,
B$;
370 PRINT@150,"$";
```

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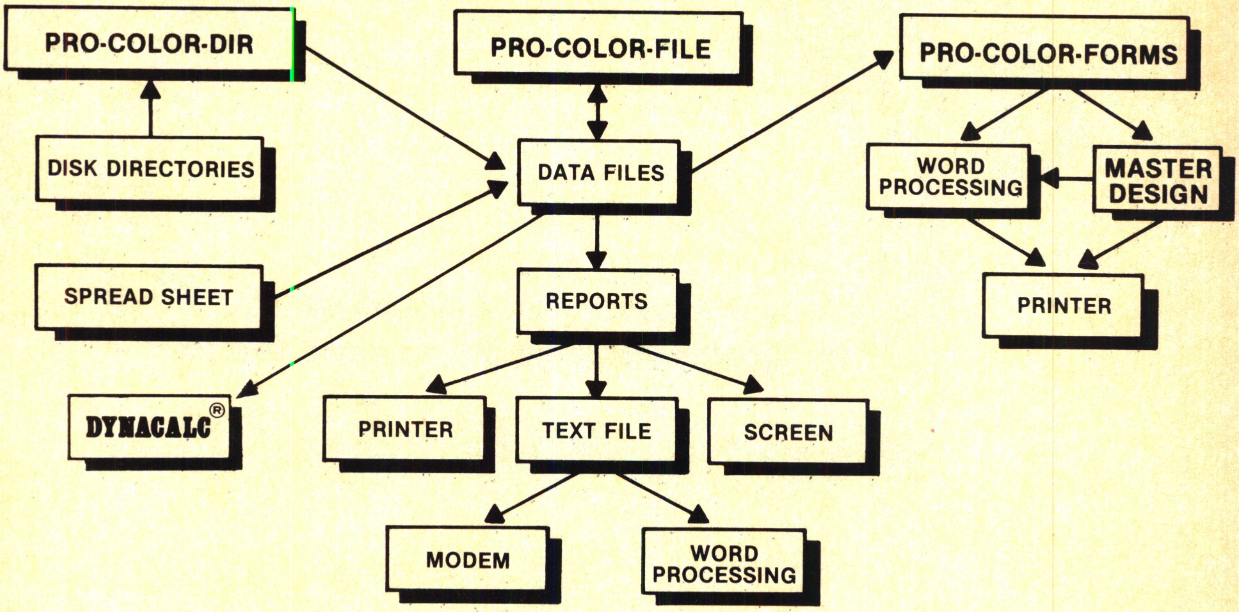
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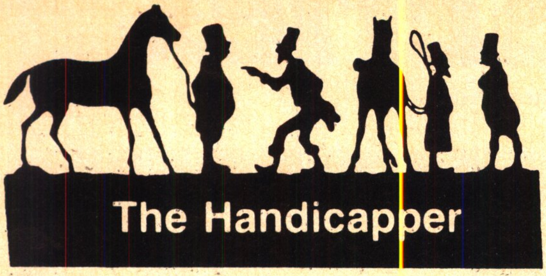

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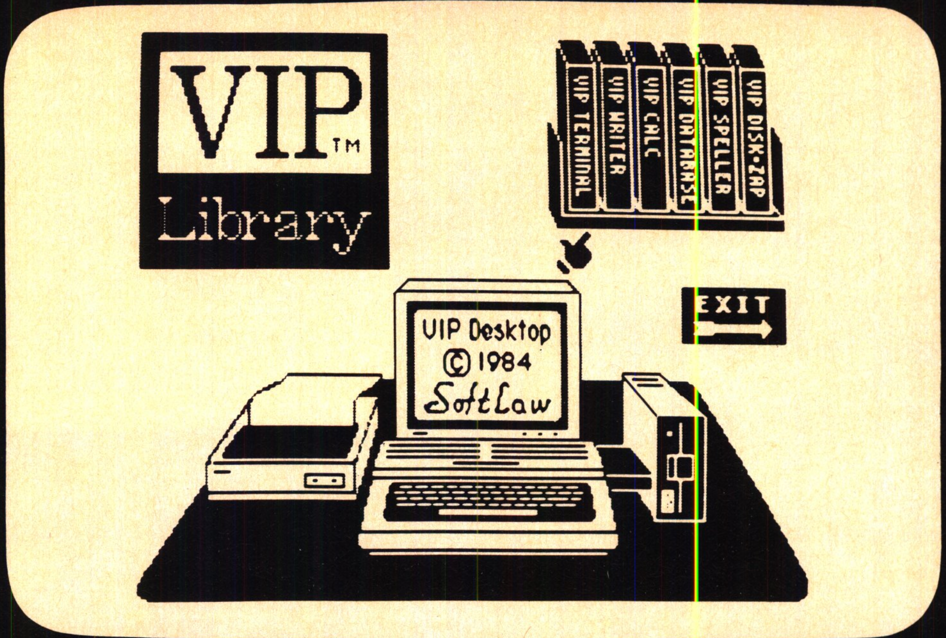
```
380 IF I$=CHR$(94) THEN 230
390 IF I$="@" THEN 580
400 P=182:GOSUB 700
410 IF I$<>CHR$(13) THEN WO$=STR
$(OC)
420 OC=INT(VAL(WO$)*100+.5)/100
430 X=9-LEN(STR$(OC))
440 FOR Z=0 TO X:PRINT@182+Z,CHR
$(143);:NEXT Z
450 PRINT@182+Z-1,OC;:PRINT@191,
B$;
460 PRINT@182,"$";
470 IF I$=CHR$(94) THEN 310
480 IF I$="@" THEN 580
490 P=310:GOSUB 700
500 IF I$<>CHR$(13) THEN WO$=STR
$(HC)
510 HC=INT(VAL(WO$)*10+.5)/10
520 X=9-LEN(STR$(HC))
530 FOR Z=0 TO X:PRINT@310+Z,CHR
$(143);:NEXT Z
540 PRINT@310+Z-1,HC;:PRINT@319,
B$;
550 PRINT@310,"%";
560 IF I$=CHR$(94) THEN 400
570 IF I$=CHR$(10) OR I$=CHR$(13
) THEN 230
580 IF HC=0 OR UC=0 OR AU=0 OR O
C=0 THEN 230 ELSE OW=(2*AU*OC)/(
(HC/100)*UC)
590 X=1
600 IF X*X<OW THEN X=X+1:GOTO 60
0
610 X=X-1
620 IF X*X<OW THEN X=X+.1:GOTO 6
20
630 X=X-.1
640 IF X*X<OW THEN X=X+.01:GOTO
640
650 X=X-.01:EO=INT(X*10+.5)/10
660 X=9-LEN(STR$(EO))
670 FOR Z=0 TO X:PRINT@470+Z,CHR
$(128);:NEXT Z
680 PRINT@470+Z-1,EO;:PRINT@479,
B$;
690 GOTO 230
700 WO$="":PRINT@P,"?";
710 I$=INKEY$:IF I$="" THEN 710
720 IF I$=CHR$(64) OR I$=CHR$(13
) OR I$=CHR$(94) OR I$=CHR$(10)
THEN RETURN
730 IF I$=CHR$(8) THEN PRINT@P,"
         ";:GOTO 700
740 IF I$<CHR$(46) OR I$>CHR$(57
) THEN 710
750 WO$=WO$+I$:PRINT@P,WO$;:H$=I
$
760 GOTO 710
```

Direct a Symphony™ on Your Color Computer



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Radio Shack Catalog No. 90-0213

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VIP Writer™

Includes VIP Speller at no additional cost!!

By Tim Nelson

RATED TOPS IN RAINBOW COLOR COMPUTER MAGAZINE & COMPUTER USER

The most powerful and easy-to-use word processor is available in the showpiece and workhorse of the **Library: The VIP Writer™**.

The result of two years of research, the **VIP Writer™** offer every feature you could desire from a word processor. It is the most powerful, fastest, most dependable and most versatile. With the hi-res display, workspace and compatibility features built into the **Library** the **Writer** is also the most usable.

". . . Nearly every feature and option possible to implement on the Color Computer. The design of the program is excellent; the programming is flawless." October 1983 "Rainbow"

"Among word processors for the CoCo, VIP Writer stands alone as the most versatile, most professional program available." May 1984 "Computer User"

The **Writer** will work with you and your printer to do things you always wanted to do. Every feature of your printer can be put to use, every character set, every graphics capability at any baud rate, EVEN PROPORTIONAL SPACING. All this with simplicity and elegance. You can even automatically print multiple copies.

Although all versions feature tape save and load, the disk version provides the Mini Disk Operating System common to the whole **Library**, plus disk file linking for continuous printing.

Professional features of particular note:

- Memory-Sense with **BANK SWITCHING** to fully utilize 64K, giving not just 24 or 30K, but up to 53K of workspace with the tape version and 50K with the disk version.
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- A TRUE EDITING WINDOW in all 9 display modes for those extra wide reports and graphs (up to 240 columns!).
- FREEDOM to imbed any number of PRINTER CONTROL CODES anywhere, **EVEN WITHIN JUSTIFIED TEXT**.
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- Automatic justification, automatic pagination automatic centering, automatic flush right, underlining, superscripts, subscripts, pause print, single-sheet pause, and print comments.
- Type-ahead, typamatic key repeat and key beep for the pros, ERROR DETECTION and UNDO MISTAKE features, 3 PROGRAMMABLE functions, auto column creation, and instant on-screen HELP.

Radio Shack Catalog No. 90-0141
32K (Comes with tape & disk) $69.95
VIP Writer — VIP Speller Combo comes in VIP Writer Binder.

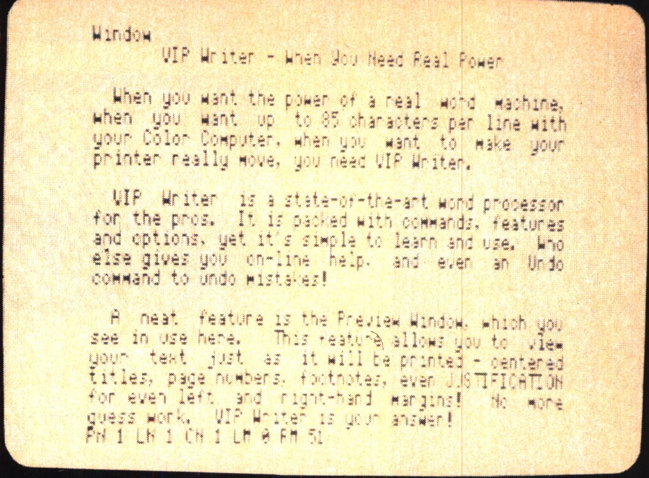
VIP Speller™

WITH A 50,000 WORD INDEXED DICTIONARY!

By Bill Argyros

Gone are the eyestrain, boredom and fatigue from endless proofreading. **VIP Speller™** is the fastest and most user-friendly speller for your CoCo. It can be used to correct any ASCII file — including **VIP Library™** files and files from **Scripsit™** and **Telewriter™**. It automatically checks files for words to be corrected, marked for special attention or even added to the dictionary. You can even view the word in context, with upper and lowercase. **VIP Speller™** comes with a specially edited 50,000 word dictionary which, unlike other spellers for the CoCo, is indexed for the greatest speed. The shorter your file, the quicker the checking time. And words can be added to or deleted from the dictionary or you can create one of your own. **VIP Speller™** also comes with the **Library's** mini disk operating system.

Radio Shack Catalog No. 90-0142
32K DISK ONLY $49.95
Hi-Res Lowercase displays not available on this program.



```
Window
         VIP Writer - When You Need Real Power

   When you want the power of a real  word  machine,
when  you  want  up  to 85 characters per line with
your Color Computer, when you  want  to  make  your
printer really move, you need VIP Writer.

   VIP  Writer  is a state-of-the-art word processor
for the pros.  It is packed with commands, features
and options, yet it's simple to learn and use.  Who
else gives you  on-line  help.  and  even  an  Undo
command to undo mistakes!

   A  neat  feature is the Preview Window, which you
see in use here.   This feature allows you to  view
your  text  just  as  it will be printed - centered
titles, page numbers, footnotes, even JUSTIFICATION
for even left  and  right-hand  margins!   No  more
guess work.  VIP Writer is your answer!
PN 1 LN 1 CN 1 LM 0 RM 51
```

VIP Calc™

By Kevin Herrboldt

You can forget the other toy calcs — The real thing is here! No other spreadsheet for the Color Computer gives you:

- **20 ROWS BY 9 COLUMNS ON THE SCREEN AT ONCE**
- **LOWERCASE LETTERS WITH DESCENDERS**
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- **FLOATING-POINT MATH**
- **CHOICE OF SINGLE AND DOUBLE PRECISION**
- **WORKS WITH BASE 2, 10, AND 16 NUMBERS**
- **UP TO 512 COLUMNS BY 1024 ROWS**
- **USER DEFINABLE WORKSHEET SIZE FOR MORE MEMORY**
- **LOCATE FUNCTION TO FIND CHECK NUMBERS, NAMES, ETC.**
- **COLUMN/ROW MULTIPLE SORTS**
- **PROGRAMMABLE FUNCTIONS**
- **IMBEDDABLE PRINTER CONTROL CODES**
- **21 ALTERABLE PRINT FORMAT PARAMETERS**
- **ON-LINE HELP TABLES**
- **DOES NOT REQUIRE FLEX OR BASIC**

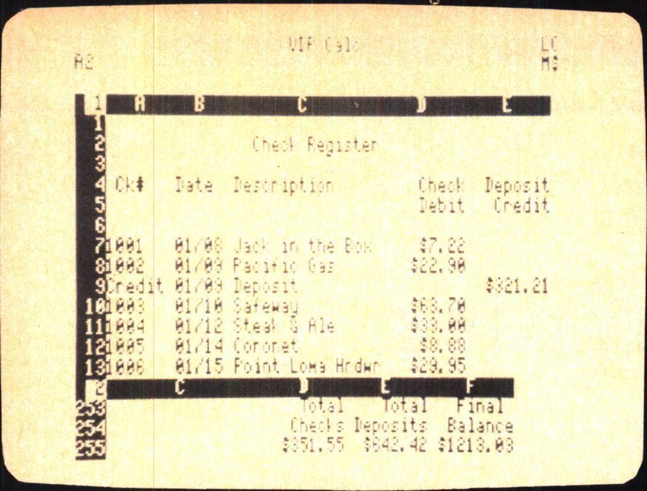
VIP Calc™ is truly the finest and easily the most powerful electronic worksheet and financial modeling program available for the Color Computer. Now every Color Computer owner has access to a calculating and planning tool better than VisiCalc™, containing all its features and commands and then some, WITH USABLE DISPLAYS. Use Visicalc templates with **VIP Calc™!**

There's nothing left out of **VIP Calc™**. Every feature you've come to rely on with VisiCalc™ is there, and then some. You get up to **5 TIMES** the screen display area of other spreadsheets for the Color Computer and Memory-Sense with **BANK SWITCHING** to give not just 24, or 30, but **UP TO 33K OF WORKSPACE IN 64K!!!** This display and memory allow you the FULL SIZE, USABLE WORKSHEETS you require. You also get: User definable worksheet size, up to 512 columns by 1024 rows! * Up to **SIXTEEN VIDEO DISPLAY WINDOWS** to compare and contrast results of changes * **16 DIGIT PRECISION** * Sine, Cosine and other trigonometric functions, Averaging, Exponents, Algebraic functions, and **BASE 2, 8, 10 or 16** entry * Column and Row, Ascending and Descending **SORTS** for comparison of results * **LOCATE FORMULAS OR TITLES IN CELLS** * Easy entry, replication and block moving of frames * Global or Local column width control up to 78 characters width per cell * Create titles of up to 255 characters per cell * Limitless programmable functions * Typamatic Key Repeat * Key Beep * Typeahead * Print up to 255 column worksheet * Prints at any baud rate from 110 to 9600 * Print formats savable along with worksheet * Enter PRINTER CONTROL CODES for customized printing with letter quality or dot matrix printer * Combine spreadsheet tables with **VIP Writer™** documents to create ledgers, projections, statistical and financial reports and budgets. Both versions feature Tape save and load, but the disk version also has the Mini Disk Operating System of the entire **Library.**

Radio Shack Catalog No. 90-0143

32K (Comes with tape & disk) $69.95

32K does not have hi-res displays, sort or edit.



```
                      VIP Calc                             LC
A2                                                         M:

 1  A       B         C            D         E
 1
 2               Check Register
 3
 4 Ck#    Date  Description         Check    Deposit
 5                                  Debit     Credit
 6
 71001    01/08 Jack in the Box     $7.22
 81002    01/08 Pacific Gas        $22.90
 9Credit  01/09 Deposit                      $321.21
101003    01/10 Safeway            $63.70
111004    01/12 Steak & Ale        $38.00
121005    01/14 Coronet             $8.80
131006    01/15 Point Loma Hrdwr   $29.95
 2          C            D         E         F
253                   Total      Total     Final
254                  Checks  Deposits    Balance
255                 $351.55   $842.42   $1213.03
```

VIP Terminal™

RATED BEST IN JANUARY 1984 "RAINBOW"

By Dan Nelson

From your home or office you can join the communication revolution. The **VIP Terminal™** opens the world to you. You can monitor your investments with the Dow Jones Information Service, or broaden your horizons with The Source of CompuServe, bulletin boards, other computers, even the mainframe at work.

For your important communication needs you've got to go beyond software that only lets you chat. You need a smart termnal so that you can send and receive programs, messages, even other **VIP Library™** files. **VIP Terminal™** has "more features than communications software for CP/M, IBM and CP/M 86 computers." Herb Friedman, Radio Electronics, February 1984.

FEATURES: Choice of 8 hi-res lowercase displays * Memory-Sense with BANK SWITCHING for full use of workspace * Selectively print data at baud rates from 110 to 9600 * Full 128 character ASCII keyboard * Automatic graphic mode * Word mode (word wrap) for unbroken words * Send and receive **Library** files, Machine Language & BASIC programs. Duplex: Half/Full/Echo, Word length: 7 or 8, Parity: Odd/Even or None, Stop Bits: 1-9 * Local linefeeds to screen * Save and load ASCII files, Machine Code & BASIC programs * Lowercase masking * 10 Keystroke Multiplier (MACRO) buffers to perform repetitive pre-entry log-on tasks and send short messages * Programmable prompt or delay for send next line * Selectable character trapping * Send up to ten short messages (KSMs), each up to 255 characters long, automatically, to save money when calling long distance.

All versions allow tape load and save of files and KSMs, but the disk version also has the Mini Disk Operating System.

Radio Shack Catalog No. 90-0139

32K (Comes with tape & disk) $49.95

(Tape works in 16K but without hi-res displays)

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VIP Database™

"ONE OF THE BEST" JULY 1984 "RAINBOW"

By Tim Nelson

This high speed MACHINE LANGUAGE program fills all your information management needs, be they for your business or home. And it does so better than any other database program for the Color Computer, featuring machine code, lowercase screens and mailmerge capabilities. Inventory, accounts, mailing lists, family histories, you name it, the **VIP Database™** will keep track of all your data, and it will merge **VIP Writer™** files.

The **VIP Database™** features the **Library** Memory Sense with BANK SWITCHING and selectable lowercase displays for maximum utility. It will handle as many records as fit on your disk or disks. It is structured in a simple and easy to understand menu system with full prompting for easy operation. Your data is stored in records of your own design. All files are fully indexed for speed and efficiency. Full sort of records is provided for easy listing of names, figures, addresses, etc., in ascending or descending alphabetic or numeric order. Records can be searched for specific entries, using multiple search criteria. With database form merge you may also combine files, sort and print mailing lists, print "boiler plate" documents, address envelopes - the list is endless. The math package even performs arithmetic operations and updates other fields. Create files compatible with the **VIP Writer™** and **VIP Terminal™**. Unlimited print format and report generation with the ability to imbed control codes for use with all printers.

As with all other **Library** programs, the **Database** features the powerful Mini Disk Operating System.

Radio Shack Catalog No. 90-0140

32K DISK $59.95

64K Required for math package & mail merge

VIP Disk-ZAP™

RAVED ABOUT IN THE APRIL 1983 "RAINBOW!"

By Tim Nelson

Your database file disk, form letter disk, or BASIC program disk goes bad. An I/O error stops loading, or even backing up of the disk. Weeks, even months of work sit on the disk, irretrievable. Now catastrophic disk errors are repairable, quickly and with confidence, using the **VIP Disk-ZAP™**. It is the ultimate repair utility for simple and quick repair of all disk errors. Designed with the non-programmer in mind, the **VIP Disk-ZAP™** will let you retrieve all types of bashed files, BASIC and Machine Code programs.

This high-speed machine code disk utility has a special dual cursor screen display to look at the data on your disk. You are able to: Verify or modify disk sectors at will * Type right onto the disk to change unwanted program names or prompts * Send sector contents to the printer * Search the entire disk for any grouping of characters * Copy sectors * Backup tracks or entire disks * Repair directory tracks and smashed disks * Full prompting to help you every step of the way * 50-plus page Operators Manual which teaches disk structure and repair.

Radio Shack Catalog No. 90-0144

16K DISK $49.95

Hi-Res Lowercase displays not available with this program.

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VIP™ Technologies

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Goleta,
California 93117

Deciphering Printer Control Codes

By Richard White
Rainbow Contributing Editor

A significant problem for a program author is the variety of printers that may be hooked up to a given machine. About the only thing that's standard is the interface hardware. Otherwise, printer control codes vary with each manufacturer's product line, sometimes they are different for various machines from the same manufacturer. Even worse are those machines which need something more than just a carriage return to print a blank line.

Fortunately, the situation is improving as most of the large volume printers sold over the past two years have DIP switches that can be set to configure the printer to match a computer for at least printing text. (Printing graphics is a different can of worms that we won't get into.)

A BASIC program still needs to have some adaptability to the system's printer. Ability to change the Baud rate covers most circumstances. In the Serial mode, Radio Shack printers support either 600 Baud or a choice of 600 or 1200 Baud.

Most other modern printers can most easily be purchased with a standard parallel interface and connected to the CoCo with one of the serial to parallel interfaces advertised in RAINBOW.

Some users then run their CoCos at 2400 or 4800 Baud. I bought a serial to parallel interface to use with my old LP VIII and run at 9600 Baud with no trouble.

(Richard White has a long background with microcomputers and specializes in BASIC programming. With Don Dollberg, he is the author of the TIMS *database management program.)*

In the CoCo, Baud rate is determined by the values in memory locations 149 and 150. After a cold start, 149 carries a zero while 150 is set at 87 corresponding to 600 Baud. Most owners will be able to send to the printer at 300 Baud or higher and can forget about memory location 149. The exceptions are those running old teletype machines at 110 Baud or less.

There is a table in the Color BASIC manual which shows what to `POKE` into 150 for various Baud rates. This system isn't perfect. I know of some CoCos that need a seven in 150 instead of a six to produce an acceptable 4800 Baud. The `POKE 150,1` for 9600 Baud is not documented in the manual, but works for all machines I know of. I do a lot of printing and the benefits of 9600 Baud versus 1200 are well worth a $60 adapter.

The printer routine for the *CHECKBOOK* program starts in Line 600. The first order of business is a rather fancy routine to calculate the currently set Baud rate and give the user the option to change it.

```
600 'TARGET LINE
605 POKE65494,0:BP=PEEK(150):BU=INSTR(1,
    "16*18**41******87**************180",
    RIGHT$(STR$(BP),LEN(STR$(BP))-1)):BU=9600/BU
```

First, we assure that CoCo is running at the standard clock speed with the `POKE65494,0`. Next, we get the value in 150 into variable BP.

The next operation is to find a value that can be divided into 9600 to yield the currently set Baud rate. This is done in the complicated `INSTR` function. `INSTR` looks through a target string for an occurrence of a search string, and reports the number of character positions from the beginning of the target string that it finds the search string.

Let's say by some weird happening, your Baud rate got set to 2400. The value in 150 would be 18. If we convert this to a string and use it to search the string ‘‘`16*18**41******87**************180`’’, there will be a match starting at character position 4. Divide four into 9600 and you have 2400. If the computer was set to 9600, the search string would be one and the first match occurs in character position 1, which `INSTR` puts into variable BU.

But, there is a rat in BASIC's woodpile. When a number is converted to a string, a space is hooked onto the beginning like `STR$(1)=`‘‘` 1`’’. To get a first character position match, we need to strip off the space; it gets a little complicated.

If we go step by step through the code `RIGHT$(STR$(BP),LEN(STR$(BP))-1))` it will make sense. `STR$(BP)` converts the number in BP to a string. `LEN(STR(BP))` finds the length of the string including the leading space. Subtract one and we have the length of the characters in the string without that space. When we get the right portion of the string for length -1 with `RIGHT$`, we will have the characters only as we need.

Is there an easier way? Searching `DATA` in a loop is one other way. If Baud rate was the only use for `DATA` in your program it would be easier. I like Line 605, since all the code is on one line, it does not require looping, and is a useful example to show how both `INSTR` and `STR$` work.

```
610 CLS:PRINT@137,"PRINT ROUTINES",,,
    "    CURRENT BAUD RATE ="BU,
    TAB(6)"RESET BAUD RATE",,,"    PRINT",,,,
    "    RETURN":CT=1
```

In Line 610, we clear the screen, print an entire menu which includes the Baud rate we just determined, and set a counting variable, CT1. The commas are the key — they move the print position to either character position (column) 17 on the screen, or to the beginning of the next line if the print position is at or past Column 17.

After printing RESET BAUD RATE, the print position is past Column 17, so one comma moves to the beginning of the next line. Two more commas create a blank line. Note that ‘‘ `PRINT`’’ does not reach Column 17, so four commas are needed to create the blank line between PRINT and RETURN.

```
615 CT$=RIGHT$(STR$(CT),1):
    LP=INSTR(1,"      1 2 3",CT$):
    LP=LP*32+2: PRINT@LP,">";: GOSUB1:
    PRINT@LP," ";: IF I$=CHR$(10)ANDCT<3 THEN
    CT=CT+1: GOTO615 ELSE IF I$=CHR$(94)ANDCT>1
    THENCT=CT-1: GOTO 615 ELSE IF I$<>CHR$(13)
    THEN 615 ELSE ON CT GOTO 620,630,100
```

Line 615 is another one that is packed with action. We want to move a '>' pointer up or down the menu using the arrow keys pointing to the RESET BAUD RATE, PRINT or RETURN choices. When the program first enters Line 615, CT=1. This is converted to a string with the leading space stripped off as discussed before and put into CT$. `INSTR` is used to obtain a line count from the top of the screen. This value in LP does us little good, since `PRINT@` needs a print position count and not a line count. LPLP*322 provides this as well as moving the print position into Column 3.

The '>' is printed pointing to the RESET BAUD RATE choice and the program goes off to the `INKEY$` subroutine in Line 1. The remainder of the line decodes the keystroke that `INKEY$` put into I$. CT may be indexed up or down within the 1-3 range, and the '>' pointer is moved accordingly on the menu. If the user makes a choice by hitting ENTER, the ASCII character 13, a carriage return is returned and the `ON CT GOTO 62,630,100` is used to initiate the chosen action.

```
620 PRINT" ";: INPUT"ENTER NEW BAUDRATE";BU$:
    BU$=LEFT$(BU$,1): BL=INSTR(1,"361249",BU$):
    IF BL=0 THEN PRINT"baud rate error": SOUND100,50: GOTO605
```

The allowed Baud rate choices are 300, 600, 1200, 2400, 4800 or 9600. Each value starts with a digit that is unique. This means we can get the user's choice in a string, strip off the leftmost character and use that to search a target string with `INSTR` to get a value. This is done in Line 620 which also includes an error trap that sends the user back to the menu.

```
625 BU(1)=180:BU(2)=87:BU(3)=41:BU(4)=18:
    BU(5)=6:BU(6)=1:BU=BU(BL):POKE150,BU:GOTO605
```

In Line 625, the values to be poked for each Baud rate are defined in the BU(X) array. `BU=BU(BL):POKE150,BU` uses BL which has the number returned by `INSTR` to choose which value to use and then pokes that value.

With the Baud rate now selected, the user is returned to the menu presumably to select PRINT, but with a chance to verify that the selected Baud rate is correct, or choose not to print and return to the data entry routine.

```
630 CLS: PRINT@96,"SET PRINTER AND PAPER AND PRESS
     any key.": GOSUB1: FORX=1TO3: PRINT#-2," ":
     NEXT: PRINT#-2,TAB(8)"ACCOUNT NAME:  "AN$:
     PRINT#-2,TAB(8)"BANK NAME:     "BA$:
     PRINT#-2,TAB(8)"ACCOUNT NUMBER: "AC$

640 GOSUB4: PRINT#-2,TAB(8) "DATE PRINTED:   "DA$:
    PRINT#-2," ":PRINT#-2,TAB(8)"CALCULATED
    BALANCE AT BANK ="BB:PRINT#-2," ":
    PRINT#-2,TAB(8)"CHECK# DATE     AMOUNT
    BALANCE  STATUS NOTE":PRINT#-2," ":
    PG=13

650 FORCR=1TOLR-1: GOSUB16: PRINT#-2,TAB(9)"";:
    PRINT#-2,USING"%  %";CC$;: PRINT#-2,USING
    " %   %";CD$;: PRINT#-2,TAB(22)"";:
    PRINT#-2,USINGSS$;CA;: PRINT#-2,TAB(32)"";:
    PRINT#-2,USINGSS$;CB;:
    PRINT#-2,"    "CS$"    "CN$
```

Lines 630 and 640 print the page heading information to start the report listing all transactions in the current file. These entries are then printed with a `FOR ... TO ... NEXT` loop starting in Line 650. Print positions are set using TAB as in `PRINT#-2,TAB(9)''''`;. `PRINT USING` is used to format the data printed. Separate `PRINT` statements are needed with `PRINT USING` so we cannot string sequences of text and variables after one `PRINT`.

```
655 PG=PG+1: IFPG>61THENFORX=1T07: PRINT#-2," ";
    NEXT: PRINT#-2,TAB(8)
    "CHECK# DATE  AMOUNT  BALANCE  STATUS NOTE";
    PRINT#-2," ": PG=5  660 NEXT: FORX=PG T067: PRINT#-2," ": NEXT:
RETURN
```

If our file is big, it will require a number of pages. Of course, we want this neatly done with bottom and top margins on the pages, and headings on the top of each added page. Some of the new fancy printers may do some of this, but with my old one, it's "I print, you keep track." So, PG=PG+1 counts lines as they are sent to the printer. `IFPG>61THEN FORX=1T07: PRINT#-2, '' '': NEXT` texts for the last line on a page to be printed. When it is reached, blank lines are printed, moving the new page into position.

Finally, new headings are printed and PG is reset to five, the number of lines on the new page that were used. When the last entry is printed, Line 660 does a "top-of-form," to position the top of the next sheet under the print head.

After all this programming work, let's ask what might be an embarrassing question. Why not do the program in a spreadsheet and forget about BASIC? That is a fair question. So fair, in fact, that starting next month "Bits And Bytes" will begin a series on CoCo spreadsheets and their use.

However, the code that starts in Line 400 of the *CHECKBOOK* program does what no CoCo spreadsheet can do. It automatically copies all cleared items to a monthly file of cleared items on tape or disk, and writes the current file to a backup file called *CURRENT/BAK* on disk. It then strips all cleared items from the current file in memory and returns to the data entry mode. This new in-memory file only includes items that have not yet cleared the bank.

There was a bug in the code as published in the January RAINBOW which we will set right in this discussion, and perhaps learn a thing or two in the process.

One needs to be very careful in automatic file naming, particularly if the code is to work on both tape and disk. The name *CURRENT/BAK* produces an FN Error (filename) in the tape save mode. Further, I found that when I had loaded the backup file using *CURRENT/BAK* and then tried to use this module, the computer tried to save the backup file as *CURRENT/BAK/BAK*. What a no-no!

```
400 CLS:PRINT@8,RC$,"   STRIP & SAVE CLEARED ITEMS"
,,,,,TAB(8)"tAPE",,,,TAB(8)"dISK",,: GOSUB1:
    IF I$="D" THEN D=1 ELSE IFI$="T" THEN D=-1
    ELSE 400

410 PRINT: PRINT: IFD=-1THENPRINT"  TAPE FILE"
    ELSE PRINT"  DISK FILE"

415 PRINT: PRINT"FILENAME";: IF D=1 THEN
    PRINT" AND EXTENSION"

420 LINEINPUTCF$: GOSUB4: CT=0: FORCR=1TOLR-1:
    GOSUB16: IF CS$="C" THEN CT=CT+1: NEXT ELSE
    NEXT
```

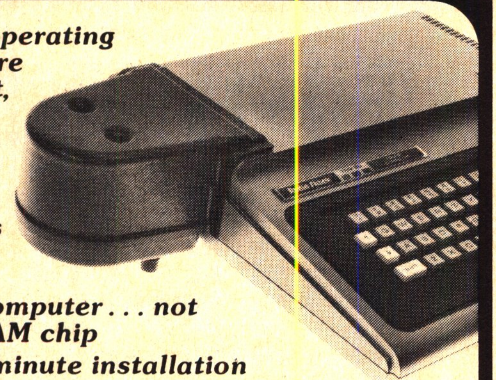
Lines 400-420 provide the entry menu that gets the disk/tape choice and then the filename, CF$, in Line 420 for the file of cleared items. Line 4 is called to allow users to change the date if they wish. The rest of Line 420 goes through the file in memory counting the number of cleared items. In order for the cleared item file to be reloaded, the number of the next record to be added (if one is to be added) must be the first entry.

```
425 OPEN"O",D,CF$: PRINT#D,CT+1: PRINT#D,BB:
    PRINT#D,CB: PRINT#D,AN$: PRINT#D,BA$:
    PRINT#D,AC$: PRINT#D,DA$: FORCR=1TOLR-1 430 GOSUB16: IF CS$="C"
THEN PRINT#D,A$(CR):
    PRINT#D,A(CR,0): PRINT#D,A(CR,1): NEXT
    ELSE NEXT
```

Line 430 opens the file, prints the standardized beginning variables and then goes through all the records in memory, finding those that are cleared and saving these to the file.

```
435 CLOSE: CT=0: OPEN"O",D,"BACKUP": PRINT#D,LR:
    PRINT#D,BB: PRINT#D,CB: PRINT#D,AN$:
    PRINT#D,BA$: PRINT#D,AC$: PRINT#D,DA$:
    FORX=1TOLR-1: PRINT#D,A$(X): PRINT#D,A(X,0):
    PRINT#D,A(X,1): NEXT: CLOSE
```

In Line 435, we close the cleared-item file, open the backup file and fix a bug. The open statement used to read `OPEN''O'',D,MN$+''/BAK''`, which I guarantee will bomb a tape save or disk save where NM$ is something like "CURRENT/BAK." All records in memory are saved



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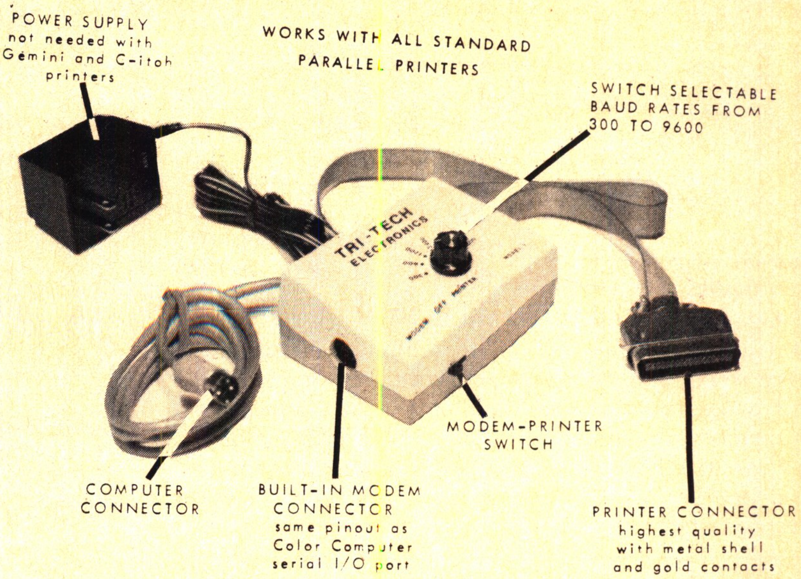
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P.O. BOX 8100 ROCHESTER, MICH. 48308 (313) 254-4242 to this file. In a disk system, this will write over the existing backup file which should no longer be needed. The current file in memory is assumed to be correct before being stripped.

```
440 FOR CR=1TO LR-1: GOSUB16: IFCS$="O"THEN
    CT=CT+1: A$(CT)=A$(CR): A(CT,0)=A(CR,0):
    A(CT,1)=A(CR,1): NEXT ELSE NEXT
```

Line 440 strips cleared items from the file. The procedure is very simple. The count variable CT was set to zero in Line 430. Each record is checked to see if its status CS$ is 'O' (for outstanding). If so, the count is incremented and the string and numeric components are copied into the CT array members. Outstanding items are copied into array members that previously contained records that have been cleared. When CR reached LR-1, all array members up to A$(CT), A(CT,0) and A(CT,1) will contain data relative to outstanding records.

```
445 FOR X=CT+1 TO LR-1:A $(X)="": NEXT:
  LR=CT+1: CR=CT: RETURN
```

Finally, we'll do some housekeeping. All strings in the array members from A$(CT) to A$(LR-1) are nulled. This looks neat, but is like washing the plates as you take them from the dishwashing machine at the end of the cycle. If you save the current file and then reload it later, these strings and their addresses will long since be gone from memory. If you should immediately add some more records, the addresses to the new data string will be set in the variable table and the old strings will be lost and wiped out during the next garbage collection.

Some things will look like just the right thing to do, but be totally unnecessary. Is it important to get this out of the program? As long as memory usage is not an issue and you don't mind waiting a few tenths of a second, the answer is "no." If ability to change the program in the future is important, the answer is "yes." Useless code only confuses. Once this column is done, I have some program editing to do.

The last part of Line 445, `LR=CT+1: CR=CT: RETURN` is very important, for here the current stripped file size is specified and CR is set to point to the last record. `RETURN` sends the program back to the data entry module where the user has the option to save the new current file and exit the program, or continue with data entry or editing.

For my current needs, the program works well. But, running around in the back of my mind are ideas on how to write the world's greatest checkbook balancing program in a spreadsheet. I may inflict you, poor reader, with another of these beasts yet!

Hint . . .

Format Your Printouts With This Disk Utility

This short program by Ted Cizadlo Selig will let you format your `LLIST`ings for any column width you please. One use for it is in debugging programs you key in from RAINBOW listings; by making your printout the same width (32 columns) as our printed listings, you can more easily see any errors you might have made. If you have a 9½-inch wide carriage printer and usually use ordinary 9½-inch fanfold paper, you can make listings 80 columns wide so they won't spill off the right side.

To use the program, simply save the program you want to `LLIST` in ASCII on disk (`SAVE ''program/ext'',A`) and run this program. Enter the column width you want and the filename including the extension, and away it goes.

A short note: The `IF F THEN` . . .statements in lines 140 and 150 are correct, even though they don't have a number to compare 'F' to or even a sign. When an `IF/THEN` statement is expressed this way, BASIC checks to see if the variable is equal to zero.

The listing:

```
5 CLEAR500:CLS:INPUT"NUMBER OF C
HARS/LINE";CL
10 INPUT"FILE NAME WITH EXTENSIO
N(MUST BEIN ASCII FORMAT)";N$
20 C=0:F=1
30 OPEN"I",#1,N$
50 LINEINPUT #1,A$
60 IF EOF(1)=-1THEN F=0
70 X=LEN(A$)
75 IF X<=CL THEN 150 ELSE IF X=0
 THEN 50
90 N=1
100 FOR J=1 TO INT(X/CL+1)
110 PRINT#-2,MID$(A$,N,CL):C=C+1
120 N=N+CL
130 NEXT J
140 IF F THEN 50 ELSE CLOSE#1:EN
D
150 PRINT#-2,A$:C=C+1:IF F THEN1
60 ELSE CLOSE#1:END
160 GOTO 50
170 CLOSE#1:END
```

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See Page 114

Once again, folks, it's time to

EXPERIENCE THE THRILL OF ADVENTURE

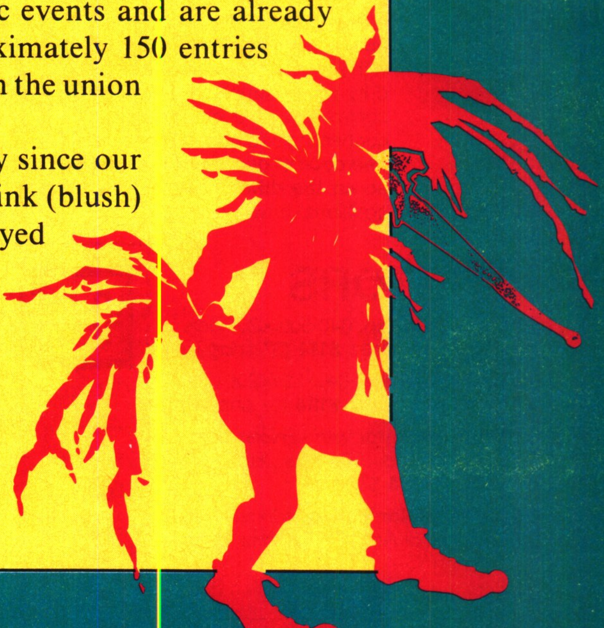
By Charles Springer

Strike up the band and unfurl the flags, please, because we have an exciting announcement:

It's time for THE RAINBOW's Third Annual Adventure Contest!

From the barrage of entries we received for last year's contest, many of you anticipate these climactic events and are already at work on a new Adventure. Approximately 150 entries were received from almost every state in the union and from several countries.

The Adventure has come a long way since our first contest in 1983 and we'd like to think (blush) that THE RAINBOW's contests have played a significant role in advancing the art. As we've noted before on these pages, the staff enjoys these contests as much as the participants because the competitive atmosphere is an obvious catalyst for programming breakthroughs.



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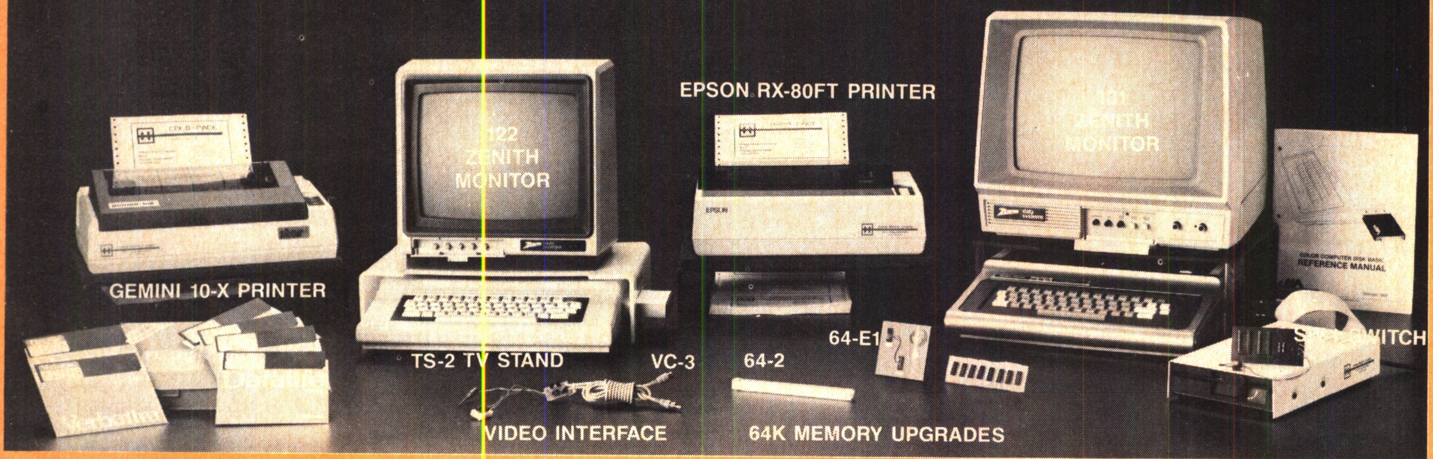

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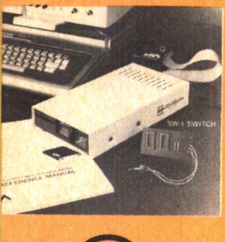

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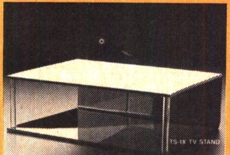

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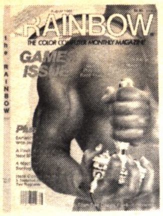

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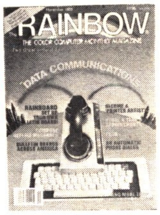

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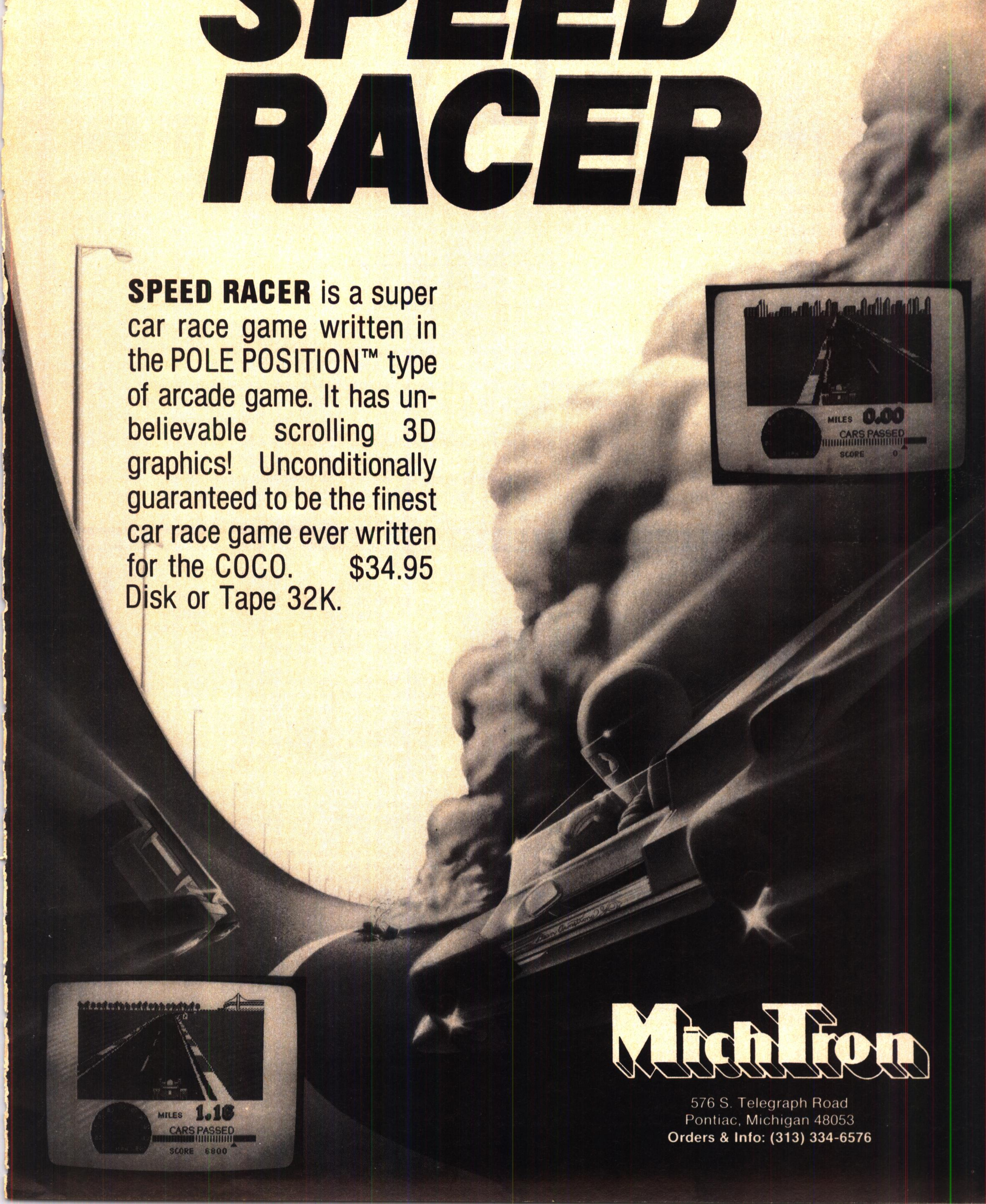
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By now you've solved last year's grand prize winners — *Rescue on Alpha II*, by Steven C. Mitchell, and *The Head of the Beast*, by Mark Nelson (both appeared in our December 1984 issue) — and taken note of their original approaches, along with the innovations, and have a good idea of what is required to wind up on top. Other winning entries will be published in *The Second Rainbow Book of Adventures*, which is in the early stages of production.

What we're looking for in Adventure contests are original concepts that appeal to a wide audience. An Adventure should be challenging, yes, but above all it should be fun to play. Arriving at a solution should require only a healthy portion of plain old common sense, not the ability to read the mind of an author you've never met.

The aspect of creativity is one that cannot be overemphasized. While we can appreciate scenarios involving castles and dungeons as much as the next person, a steady diet of them would cast the Adventure as a fad and it would end up in a heap in one of those 1,2000-room mazes.

A creative program that comes to mind is *Yellow Submarine*, a graphics Adventure by Mark Fetherston of Kenosha, Wis. Look for it in the second Adventure book because the subject obviously has great appeal. The mere title suggests this is one of those programs which could cause permanent damage to your knuckles in your haste to position it in the disk drive.

We're also looking for programs that demonstrate new capabilities for the Color Computer. Remember the excitement of loading in the first graphics Adventure? It gave all of us a collective sense of accomplishment and a renewed determination in fulfilling CoCo's incredible potential, as evidenced by the slew of graphics entries we received in last year's contest. We also received some entries that required joysticks.

> ***"What we're looking for in Adventure contests are original concepts . . ."***

We do expect some surprises because CoCo users have, time and again, proven themselves to be an innovative group.

Now, let's get to the rules. Our desire for fairness dictates that we establish a uniform set of guidelines. We've already mentioned creativity, of course. Other considerations include originality, clarity of instructions and/or documentation, ease of loading, grammar, resolution, responsiveness, level of challenge and, most importantly, enjoyment.

Please remember that each program *must* be "memory resident"; that is, self-contained after being loaded into the Color Computer. For practical reasons, entries that access the disk while the program is running will not be considered. Disk-accessing leads to excessive length in programs. All entries should run on standard Radio Shack computer equipment, with no special modifications required because of the program.

We will consider only original, unpublished and unmarketed programs. One of the primary purposes of the programming competition is to bring new ideas and concepts to the CoCo. Conversions of existing programs, therefore, are not acceptable. Also, entries should be self-contained and not dependent upon other commercial programs for their execution.

In writing the Adventure, be careful not to pack the lines so tightly that we are unable to `LIST` or `LLIST` a line. If a program contains machine language, fully-commented source code must be provided as well as a working, assembled

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Kishore M. Santwani

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String Functions:	CHR$, LEFT$, MID$, RIGHT$, LEN, INSTR, LSET, RSET, TRM$, STR$, STRING$, INKEY$, MKN$
Numeric Functions:	ABS, POS, TIMER, RND, ASC, TAB, CAL, JOYSTK, PEEK, POKE, LOC, LOF, EOF, FREE, CVN, ERR, VARPTR, SWAP
I/O Commands:	OPEN, CLOSE, INPUT, LINEINPUT, PRINT WRITE, PRINT @, GET, PUT, KILL, CHAINM, FIELD, DATA, READ, RESTORE
Program Control:	FOR/NEXT/STEP, GOTO/GOSUB, IF/THEN/ELSE, RETURN, STOP, RETI, ON n GOTO/GOSUB, ON ERROR, ON RESET, ON IRQ/FIRQ/NMI, ON OVR/NOVR, EXEC, LET
Directives:	ORG, REM OR ', END, DIM, END, BASE, RAM, ON/OFF, RAM64K, HIRES, GENERATE, DPSET, STACK
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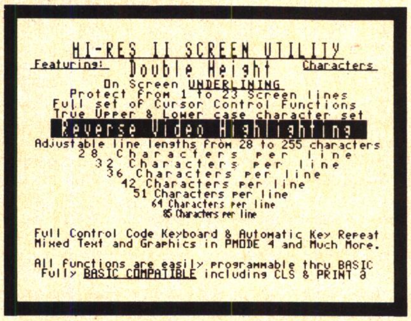

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PROGRAM FEATURES	**HI-RES II** NEW	**HI-RES I** OLD	**BRAND X**
Upper/Lower case characters	Yes	Yes	Yes
Mixed Text and Graphics	Yes	Yes	Yes
Separate Text & Graphics	Yes	Yes	No
Print @ fully implemented	Yes	Yes	Yes
Print @ on all line lengths	Yes	Yes	51 only
Different line lengths	28 to 255 (9)	28 to 255 (9)	51 only (1)
Automatic Key Repeat	Yes	Yes	Yes
Adjustable Key Repeat	Yes	No	No
Auto Repeat Disable	Yes	No	No
Erase to end of line/screen	Yes	Yes	Yes
Home Cursor	Yes	Yes	Yes
Solid or Blinking Cursor	Yes	No	Yes
CLS command supported	Buff/Biack	Buff/Black	Buff/Black
X,Y Coordinate Cursor Positioning	Yes	Yes	No
Double Size Characters	Yes	Yes	No
Individual/Continuous Highlighting	Yes	Yes	No
On Screen Underlining	Yes	Yes	No
Clear Key functional	Clear/L keys	Clear key	No
16.32 & 64K Supported	Yes	Yes	Yes
Green or Black Background Color	Yes	No	No
Dual Character sets for Enhanced 64 and 85 Characters per line display	Yes	No	No
Protected Screen Lines (programmable)	1 to 23	No	No
Full Control Code Keyboard for Screen control directly from the keyboard	Yes	No	No
Programmable Tab Character Spacing	Yes	No	No
Full Screen Reverse Function	Yes	Yes	No
Switch to & from the Standard 16 by 32 Screen for full compatability	Yes	No	No
On Error Goto Function	No	No	Yes
Extended Basic Required	No	Yes	Yes
All Machine Language Program	Yes	Yes	Yes
RAM Required in addition to Screen RAM	2K	2K	2K
Program Price (Tape)	$24.95	$19.95	$29.95

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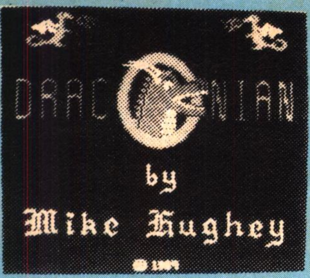
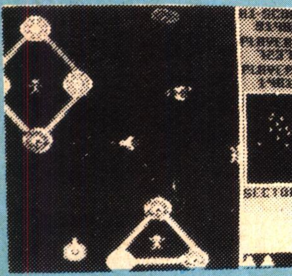




DRACONIAN

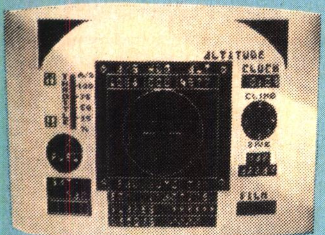
You brace yourself as your ship materializes in the enemy sector. Your engine roars to life, and you consult the long-range scanner for the position of the nearest enemy base. As you head for the base, blasting asteroids and space-mines in your path, you suddenly notice a monstrous space-dragon looming before you. Reacting quickly, you dodge his deadly fire-breath and blast him out of existence.

This is it — the single most impressive, awe-inspiring arcade game you can buy for your Color Computer. High-resolution graphics, awesome sound effects, four-voice music, and quality you have to see to believe! Experience the realism of DRACONIAN today!

JOYSTICKS REQUIRED

32K MACHINE LANGUAGE

TAPE $27.95 DISK $30.95



SR-71

SR-71 is a fast action game in which you are the pilot on a mission to take photographs of missile sites in Russia and deliver them to our processing laboratory in Japan. So real you will feel as if you are in the cockpit on a real spy mission. Elude Russian missiles as well as their detection devices. Another Tom Mix exclusive. A must for the adventurous. Fantastic graphics, color and sound. **32K Ext. Basic.**

TAPE $28.95 DISK $31.95

New From Tom Mix

Worlds of Flight

Not A Game — A Very Realistic Flight Simulation

WORLDS OF FLIGHT (WOF) is a "view" oriented flight simulation for the TRS-80 Color Computer, written entirely in Machine Language. "View" oriented means that the pilot may determine his or her position by actually viewing the surrounding landmarks as opposed to using instruments which sense navigational references. This is a major departure from "instrument only" simulations which can be achieved through BASIC programs. Most instrument maneuvers and procedures may be practiced. The craft is a light-weight, single-engine airplane with low wings. A nose wheel which is both steerable and retractable is also modeled. Some aerobatics are possible including sustained inverted flight, aileron rolls, spins and stalls.

JOYSTICKS REQUIRED

32K MACHINE LANGUAGE

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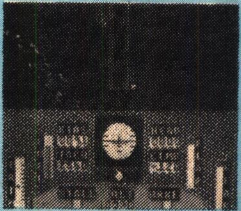
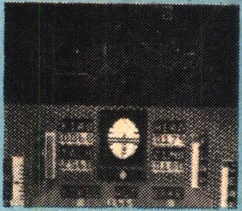
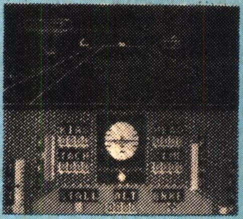
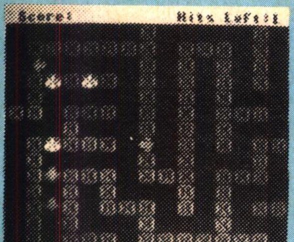








WAREHOUSE MUTANTS

Journey through the warehouse seeking out the Mutants who are out to destroy you. WATCH OUT! They will push crates trying to crush you! Outstanding realism—high resolution graphics—multiple screens.

JOYSTICKS REQUIRED

16K MACH. LANGUAGE

TAPE $24.95

DISK $27.95

QUIX

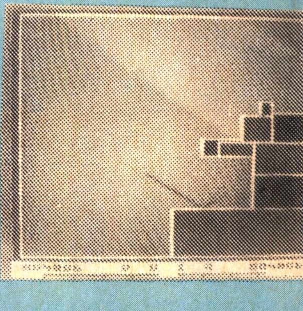
This one is after a popular arcade game with a similar name. Simply frustrating—you'll love it. Done in high resolution graphics with Super Sound.

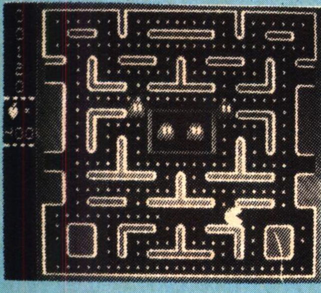
JOYSTICKS REQUIRED

32K MACH. LANGUAGE

TAPE $24.95

DISK $27.95





MS. MAZE

MS. MAZE is remarkable in that it combines brilliant color, high resolution, detailed graphics, and music with a very playable game. Anything that could be done to make the Color Computer look and play like the arcade version has been done. MS. MAZE is without question the closest thing to the arcade Pac games that I have seen for the Coco.

JOYSTICKS REQUIRED

32K MACHINE LANGUAGE

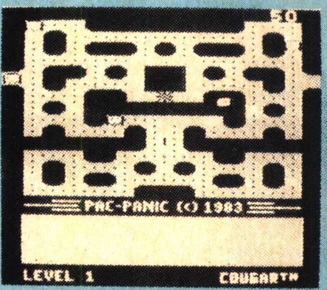
TAPE $24.95 DISK $27.95

PAK-PANIC

Pakman is steered thru a maze eating dots and powerpills. Pakman is pursued by four monsters who try to catch and kill him. If Pakman eats a powerpill he becomes powerful and can eat monsters. Monsters try to avoid a powerful Pakman. As monsters are eaten their ghosts appear on the top of the screen. When seven ghosts have appeared one will fly across the screen or they will link together forming a centipede that will travel thru the maze. Pakman has no power against ghosts and centipedes and must avoid them or be killed. **JOYSTICKS REQUIRED**

32K MACHINE LANGUAGE

TAPE $24.95 DISK $27.95



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16K Extended basic/32K for printer output

The Vocabulary Management System (VMS) is a series of programs designed to aid a parent or teacher in helping children to learn and practice using vocabulary and spelling words. The 11 programs that comprise the VMS include a full feature data entry/edit program, three printer output programs and 5 vocabulary/spelling game programs. The system's many outstanding features include:

—As many as 300 vocabulary words and definitions may be in the computer's memory at one time.

—Words and definitions may be saved on disk or tape.

—Remarks and/or comments can be saved with word files.

—A disk loading menu allows students to load disk files without typing file names.

—Word lists may be quickly alphabetized.

—The three printer segments allow you to create and print individualized tests, puzzles, word-searches and worksheets.

TAPE $39.95 DISK $42.95

—The printer segments allow full use of your printer's special features.

—The 5 game programs are based on sound educational principles and provide practice in identifying words and matching them with their definitions in a fast-paced set of activities.

FRACTIONS - A Three Program Package - 32 K EXT. BASIC TAPE $30.95 DISK $35.95

MIXED & IMPROPER

1. Review converting mixed numerals and improper fractions.
2. Practice converting mixed numerals to improper fractions.
3. Practice converting improper fractions to mixed numerals.
4. Practice of both types. (Mixed to improper & improper to mixed)
5. Review converting mixed numerals to mixed numerals. (Used in regrouping in substraction)
6. Practice converting mixed numerals to mixed numerals.

EQUIVALENCE

1. Definitions of terms and review of finding equivalent fractions.
2. Practice finding equivalent fractions.
3. Practice finding sets of equivalent fractions.
4. Review of finding if one fraction is equal to, not equal to, less than or greater than another.
5. Practice finding if one fraction is equal to, not equal to, less than or greater than another.

LOWEST TERMS

1. Review of placing fractions into lowest terms by finding the greatest common factor (GCF) of the numerator and denominator.
2. Practice finding the GCF of pairs of numbers.
3. Practice placing fractions into lowest terms by finding the GCF of the numerator and denominator.

TEACHER'S DATABASE

TEACHER'S DATABASE is a program designed to allow a teacher to keep a computerized file of information about his/her students. There are many features that make this program particularly attractive:

- Information on as many as 100 students (or more) may be in the computer at one time.
- Each student may have as many as 20 (or more) individual items of data in his/her record.
- The program will run from cassette or disk.
- Cassette and disk files are completely compatible.
- The program is menu driven.
- Records may be easily changed, deleted, combined or added.
- Information about students may be numerical or text.
- Records may be quickly alphabetized.
- Records may be sorted by various criteria.
- Records may be reordered (ranked) based on test scores or other data.
- Data displayed during a sort may be printed on a printer or saved on disk or cassette as a new file.
- A full statistical analysis of data may be done and sent to the printer.
- Student test scores may be weighted.

REQUIRES 32K EXT. BASIC
TAPE $39.95 DISK $42.95

MATH DUEL

MATH DUEL is a challenging mathematics game that pits you against the computer it a game of wits. You must use all of your knowledge of factors, multiples and prime numbers to develop a strategy that allows you to gather more numbers and thus more points that than the computer.

The game is deceptively simple. You select the size of the playing field that is composed of from 8 to 100 numbers. You must then choose numbers that will give you the maximum number of points and the computer the least number of points. There are only 6 rules.

1. Any number that you chose must have at least one factor still on the playing field.
2. You receive points equal to the face value of the number that you chose.
3. The computer receives points equal to the face value of all of the remaining factors of the number that you chose.
4. All of the numbers that were awarded to you or to the computer are removed from the field.
5. The game continues until there are no numbers with factors remaining.
6. At the end the computer receives points equal to the value of all of the remaining numbers.

32K EXT. BASIC TAPE $24.95 DISK $29.95

ESTIMATE

ESTIMATE is a program designed to help children to practice estimating the answers to addition, subtraction, multiplication and division problems on the Color Computer. it has many features that make its use particularly attractive.

- Up to 5 students may use the program at the same time.
- There are 5, user modifiable, skill levels.
- The acceptable percent error may be changed as a student's skill improves.
- A timer measures the number of seconds used to answer each problem and the total time used for a series of problems.
- If a problem has been answered incorrectly, the student is told the percent error and asked to try again.
- If a problem is answered incorrectly a second time, the student is told the correct answer and the range of acceptable answers is displayed.
- A report is given at the end of each set of problems that includes the number of problems done, the number of problems answered correctly on the first try and the average percent error.
- The (BREAK) key has been disabled so that child will not inadvertently stop the program from running. **REQUIRES 16K EXT. BASIC**

TAPE $19.95 DISK $22.95

PRE-ALGEBRA I INTEGERS

INTEGERS is a series of four programs designed to give students practice in working with addition, subtraction, multiplication, division and the comparison of integers. It has many features that make a very valuable tool for introducing and/or maintaining skills.

- Up to 4 students may use the program at the same time.
- There are 9, user modifiable, skill levels.
- Students are given two opportunities to answer a problem.
- A detailed report of student performance, including number correct on first try, number wrong, total time used and percentage score, is presented at the end of a series of problems.
- The programs will run on a 16K TRS-80 Color Computer with or without disk drive.

Four distinct problem formats are presented. The first presents problems in this format: −12 + −9 = ? The second program presents a problem with missing numerals in this format: −7 −? = 18. The third program presents a problem with a missing sign: 8 − ?6 = 14. The last program asks the student to determine the relationship (=, ◄ or ►) between two statements 3 −9 (??) −4 −5.

32K EXT. BASIC
TAPE $28.95 DISK $33.95

PRE-ALGEBRA II

The second **PRE-ALGEBRA PACK** is composed of two programs, EQUATION SOLVER AND EQUATION DUEL, that are designed to give students practice in using and solving equations. It has many features that make a very valuable tool for introducing and/or maintaining skills:

- In both programs students may choose the range of numerical values that will be included in the equations so that the difficulty may change as their skill increases.
- In EQUATION SOLVER the computer secretely generates a random equation, shows the numbers that it used in the equation and the answer and challenges the student to create his/her own equation that uses the same numbers and results in the same answer.
- In EQUATION DUEL the student and the computer race to see who will be the first to create an equation from the same set of random numbers.
- Both programs give detailed reports of the student's and the computer's performance in creating and solving equations including time used, score and percentage correct.

32K EXT. BASIC
TAPE $28.95 DISK $33.95

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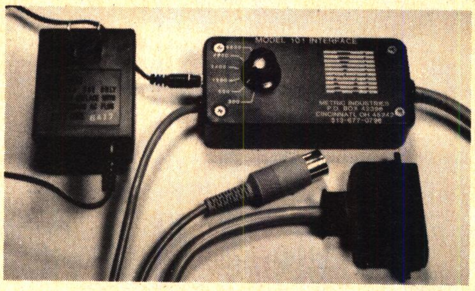
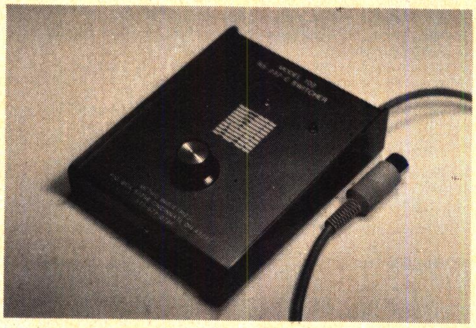
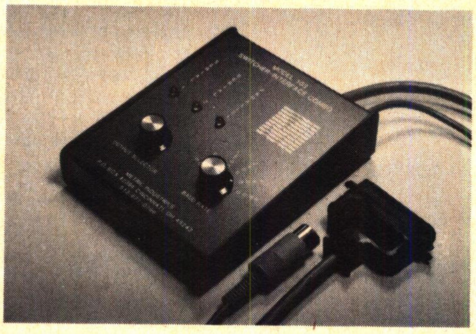
MODEL 101 INTERFACE 54.95
The Model 101 is a serial to parallel interface intended for use with a COCO and any Centronics compatible parallel input printer. The 101 has 6 switch selectable baud rates (300-9600). It comes with a "UL" listed power supply that can be unplugged from the interface if your printer supplies power (Most do). The 101 is only 4" x 2" x 1" and comes with all cables and connectors for your computer and printer.



MODEL 102 SWITCHER 35.95
The Model 102 has 3 switch positions that allow you to switch your computer's serial output between 3 different devices (modem, printers or another computer). The 102 has color coded lights that indicate the switch position. These lights also act as power indicators to let you know your computer is on. Supplied with the 102 are color coded labels that can be applied to your accessories. The 102 has a heavy guage anodized aluminum cabinet with non-slip rubber feet.



MODEL 103 COMBO 85.95
With the turn of a knob the model 103 switches your computer's RS232C serial port to any one of 3 outputs — 2 serial and 1 parallel. The serial ports may be used for modems, serial printers or even another computer. The parallel port can be used with any Centronics compatible printer. The 103 has the best features from the 101 and 102: color coded position indicator lights, 6 switch selectable baud rates, heavy anodized aluminum cabinet, "UL" listed power supply and many more.



The Model 101, 102 and 103 will work with any level COCO basic, any memory size 4K-64K and are covered by a 180 day warranty.

The Model 101 and 103 work with any standard parallel input printer including Gemini, Epson, Radio Shack, Gorillia, C.Itoth, Okidata and many others. They support basic print commands, word processors and graphic commands.

CASSETTE LABEL
CASSETTE LABEL PRINTING UTILITY
SIDE ONE
M/L PGM
(C) 1984 METRIC INDUSTRIES

CASSETTE LABEL PROGRAM 6.95
This fancy printing utility prints 5 lines of information on pinfeed cassette labels. "Cassette Label" is menu driven and is very easy to use. It uses the special features of your printer for standard, extended or condensed characters. Each line of text is automatically centered. Before the label is printed, it is shown on your CRT — enabling you to make changes if you like — then print 1, 2 or 100 labels. The program comes on tape and it is supplied with 24 labels to get you started. 16K ECB required.

OTHER ITEMS
High quality 5-screw shell C-10 cassette tapes **$7.50/dozen**
Hard plastic storage boxes for cassette tapes **$2.50/dozen**
Pin feed cassette labels **$3.00/100**

VISA MasterCard

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Or send check or money order to:
METRIC INDUSTRIES
P.O. BOX 42396
CINCINNATI, OH 45242

Free shipping on orders over 50.00. Ohio residents add 5.5% sales tax.

We manufacture these products. Dealer inquiries are invited.

version of the program. After all, we want to share your masterpiece with our readers.

Entries should be submitted on good quality tape or disk, and it is best to make several saves, at least one of them in ASCII format. Unfortunately, we do not have the time to key in program listings. Please do not submit programs that have been submitted for publication to other magazines. Your entry must be postmarked by July 1, 1985 to be eligible for consideration, and should be addressed to "Adventure Contest Editor."

Complete documentation should be included with all entries, including thorough instructions on how to load and run all portions of the program. You should enclose a descriptive introduction setting the scene for the Adventure, as well as detailed and exact instructions on how to solve the puzzle — clues and hints are nice, but our judges, in their conscientious efforts to give equal consideration to all entries, sometimes get frustrated (we get stumped, too) and need help.

It is a good idea, too, to include your name, address and telephone number for any and all materials submitted, including the documentation, program disks and cassettes.

If you need an introduction to, or refresher course on Adventures, you may want to refer to our December 1984 issue which contains last year's winning entries, along with the judges' comments on many entries. Our February 1984 issue contained two helpful articles — "Recipe For Adventure," by Eric W. Tilenius, and "The Making Of An Adventure," by Bob Liddil. You also may want to refer to *The Rainbow Book of Adventures*, which contains 13 winning entries from our first contest and comments from the judges of that competition. And, in next month's issue, Eric Tilenius will provide a complete bibliography of RAINBOW's many Adventures and Adventure-writing tutorials, as well as his latest advice on how to create a winning entry.

Many of THE RAINBOW's generous advertisers again are donating some wonderful prizes, many of which are listed in a full-page ad on Page 41 in this issue for this year's contest. And, of course, the winning programs will be featured prominently in an upcoming issue of THE RAINBOW.

Good luck. We're looking forward to another great contest!

ANNOUNCING
THE THIRD ANNUAL RAINBOW ADVENTURE CONTEST

Calling all veteran and novice Adventurers. The RAINBOW Adventure Contest is back by popular demand! Here's your chance to shine.

Your Adventure can encompass any setting you can imagine. Write it in 4K, 16K, 32K or 64K, in BASIC or machine language, graphics or traditional text-only style. No specific categories. Send it in. We simply want your best!

Watch for Adventure tutorials in upcoming issues of THE RAINBOW. Check back issues for dozens of articles on Adventures and sample games. *The Rainbow Book of Adventures* is another excellent source.

Originality counts plenty, as does proper attention to documentation. Include a complete solution to the Adventure, along with features and aspects that deserve the judges' attention. In writing the Adventure, don't pack so tightly that we can't `LIST` or `LLIST` an entire line. If the program includes machine language, fully-commented source code must be provided, as well as a working, assembled version of your program. After all, we do want to share your gem with our readers. Indicate the minimum system needed to run your program, i.e., 32K ECB. Your program should run on standard Radio Shack equipment with no special modifications required and should not rely on commercial software for its execution. Put the accompanying article, the documentation, complete loading instructions and cover letter on paper. Include your name, address and telephone number on each page of all materials.

It is mandatory that several saves of your Adventure be submitted on good-quality tape or disk; if it won't load, it will not be judged. We will not type in even the shortest of entries. Be sure to write-protect your disk or punch out the tabs on your tape to avoid accidental erasure and label each with the name of the program and your name and address. As in any contest, packaging does make a difference.

Above all, get your entry in by July 1, 1985 in bug-free condition. Each entrant will receive a free pass to the RAINBOWfest of his or her choice. You could win any of the prizes donated by these generous businesses.

Ankia Research	$50 software of your choice.
Aurora Software	Stock Broker program.
Cer-Comp	$50 gift certificate.
Classical Computing	Adventure Cracker, Speak Up!
Cognitec	Telewriter-64.
Color Connection Software	Puzzler, Megamunk, 10Key.
Colorware	CoCo Max.
Delker Electronics	DMP 105 Printer.
Derby City Software	PP Color Dump, Disk Sort & Order, Gemini Epson Screen Dump.
Derringer Software	Pro-Color-File series package.
Duggers Growing Systems	$50 software of your choice.
E.A.P. Company	Gold Plug disk module.
Four Star Software	Coco Paint, Bugs II, Galactic Fighter.
Great Plains Computer Company	STYLO-Spell (OS-9 or FLEX).
Kelly Software Dist.	$50 software of your choice.
Microtech Consultants	XTerm, XWord, XMenu, XScreen (OS-9).
The Other Guy's Software	Keep-Trak, Bob's Magic Graphic Machine, AMT.
Owl's Nest	$100 software of your choice.
Polygon Company	$50 gift certificate.
REM Industries	CoCo Cooler.
Saguaro Software	Eagle & Sketchpad, both on disk.
Triad Pictures Corp	Animator series of four programs.
Valley Micro Systems	New BASTXT and New Disk Assembler.
Vidtron	Editron, Lister, Cross Ref, Bar Dumb.
Wasatchware	MLBASIC Compiler.
YGS	Utility One, Utility One & OS9 BASIC, Utility One & Two, plus OS9 BASIC.

RULES: All programs must be original, unpublished and unmarketed works, no "conversions." Entries must be postmarked prior to July 1, 1985, and become the property of Falsoft, Inc., publisher of THE RAINBOW. Decision of the judges is final. Duplicate prizes will be awarded in the event of ties. Winning programs will be featured in a special RAINBOW Adventure issue. Address entries to "Adventure Contest Editor" and send to THE RAINBOW, 9529 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059.

ADVENTURE GAME

32K
ECB

the
RAINBOW

A Night Of Horrors In Lurkley Manor

By Richard Ramella

It's Halloween. You're locked in Lurkley Manor with an assortment of bizarre people and other unearthly things. You must use your skill and logic to escape the house without getting bumped off.

Lurkley Manor comes wrapped in a "fiendishly" long program listing which requires 32K and Extended Color BASIC. I hope you'll find the program worth the work, for it's an all-graphics logic puzzle with 16 scenes, 11 characters, animation and text in the Extended graphics mode. You will see the instructions when the program runs.

If your computer does not support the `POKE 65495,0` "speed poke," you must delete it from lines 2 and 1830 of the listing.

If you wish the text to stay on the screen longer before erasing, in Line 2630 increase the timer loop from `FOR T=1 TO 1000` to `FOR T=1 TO 2000` or greater. The title sequence and instructions may be skipped by inserting `GOTO 160:` at the start of Line 120. Do not renumber lines 1 to 64; this will cause the program to work incorrectly.

A self-addressed, stamped envelope gets you the step-by-step instructions for escaping *Lurkley Manor*. Send your request to 1493 Mt. View Ave., Chico, CA 95926.

(Richard Ramella has written two books and numerous articles on TRS-80 topics. He is a writer for a California hospital.)

15	127	1330	122
35	217	1450	110
62	18	1560	22
180	233	1710	237
280	247	1850	163
380	56	1980	235
500	190	2110	205
610	90	2220	39
710	121	2310	86
790	76	2400	121
880	144	2480	153
1020	88	2580	72
1110	115	END	45
1200	109		

The listing:

```
1 REM * LURKLEY MANOR * TRS-80 E
XTENDED COLOR BASIC / RAMELLA
2 CLEAR 500: POKE 65495,0
3 W$="DIRECTION?": DI$="NEWS": W
A$="YOU RUN INTO A WALL.": GOTO
100
4 X=X-6: RETURN
5 Z$="30353838": RETURN
6 Z$="10135053": RETURN
7 Z$="2029606903930797": RETURN
8 Z$="7000000404747479790940 49":
 RETURN
9 Z$="111179792970": RETURN
10 Z$="79000070700505090965": RE
TURN
11 Z$="3033": RETURN
12 Z$="402222272749": RETURN
13 Z$="406262676749": RETURN
14 Z$="43472424262664646666": RE
TURN
15 Z$="42481575": RETURN
16 Z$="2937": RETURN
17 Z$="2575": RETURN
18 Z$="4949": RETURN
19 Z$="7009": RETURN
20 Z$="60200108296978716228": RE
TURN
21 Z$="234040482959": RETURN
22 Z$="0220206060737375750707090
979": RETURN
23 Z$="0220206060737375753575787
86969292908": RETURN
24 Z$="000606765059": RETURN
25 Z$="7000000404646475757777595
9191908": RETURN
26 Z$="7020200202070729297979787
8757515": RETURN
27 Z$="00707009": RETURN
28 Z$="0110106060717173736464141
4030301140505080819196969787875 7
564": RETURN
29 Z$="7414140303010110106060717
178786969191908": RETURN
30 Z$="43434747": RETURN
31 Z$="43432937": RETURN
32 Z$="72050577": RETURN
33 Z$="12721575": RETURN
34 Z$="02757507": RETURN
35 Z$="0220206060717173736464343
4373939": RETURN
36 Z$="5634341414050507071818686
87777272505011110 2": RETURN
37 Z$="0920205050797414": RETURN
38 Z$="0009096969787864640464737
37171606000": RETURN
39 Z$="7160601010010108081919696
978": RETURN
40 Z$="00090969697575727250500 0"
: RETURN
41 Z$="7000000909790565": RETURN
42 Z$="700000090565": RETURN
43 Z$="6010100101070729296969667
646": RETURN
44 Z$="000970790575": RETURN
45 Z$="206029694049": RETURN
46 Z$="70777759593939060604": RE
TURN
47 Z$="000905702379": RETURN
48 Z$="00090979": RETURN
49 Z$="0900004545707079": RETURN
50 Z$="090000797970": RETURN
51 Z$="1070707969190801": RETURN
52 Z$="0901107171746505": RETURN
53 Z$="10707079691908017956": RE
TURN
54 Z$="09000070707373646404047 9"
: RETURN
55 Z$="70000004047474797909": RE
TURN
56 Z$="00704049": RETURN
57 Z$="000909797970": RETURN
58 Z$="00494970": RETURN
59 Z$="0029294545696970": RETURN
60 Z$="00790970": RETURN
61 Z$="004545704549": RETURN
62 Z$="007070090979": RETURN
63 IF Q$=CHR$(32) THEN RETURN
64 FOR H=1 TO LEN(Z$) STEP 4: LI
NE(X+VAL(MID$(Z$,H,1)),Y+VAL(MID
$(Z$,H+1,1))-(X+VAL(MID$(Z$,H+2
,1)),Y+VAL(MID$(Z$,H+3,1))),PSET
: NEXT: RETURN
100 PMODE 3,1: PCLS: SCREEN 1,1
110 P1$="L10;O1;G;F;D#;D": P2$="
L10;G;G#;G;F;D#": P3$="L10;F;L4;
G": P4$="L4;D;L1;C": COLOR 3,0
120 GOSUB 1740: GOSUB 2650: KZ=1
: GOSUB 1600
130 A$="I AM, OF COURSE, IGOR. Y
OU ARE AN UNLUCKY FOOL NOW LOCKE
D IN LURKLEY MANOR.": GOSUB 1530

140 A$="TO TRAVEL, PRESS N FOR N
ORTH, E FOR EAST, W FOR WEST, S
FOR SOUTH.": GOSUB 1530
150 A$="IN EVERY SCENE YOU FACE
NORTH.": GOSUB 1530: A$="FIND TH
E ATTIC TO ESCAPE... PERHAPS.":
GOSUB 1530
160 GOSUB 2650: A$="THE GREAT HA
LL": GOSUB 1530: GOSUB 2510: GOS
UB 2520: GOSUB 2530
170 DRAW "BM100,95;U50L10U5R70D5
L10D50L50": CIRCLE(125,76),21,,1
.5,.4,.12: T1=90: B1=T1: PAINT(1
25,76),3,3
180 IF PW=0 THEN A$="IT IS EMPTY
 EXCEPT FOR A ROARING FIREPLACE.
": GOSUB 1530: PW=1
190 A$=W$: GOSUB 1530
200 FOR J1=3 TO 4: COLOR J1,0: L
INE(112+RND(25),93)-(112+RND(26)
,60-RND(5)),PSET: NEXT
210 X$=INKEY$: IF X$="" OR INSTR
(DI$,X$)=0 THEN 200
220 IF BU$="OK" AND X$="N" THEN
BU$="": PA$="PA": A$="YOU DOUSE
THE FIRE AND ENTER": GOSUB 1530:
 PAINT(125,56),2,1: GOTO 2590
230 IF X$="N" THEN 1310 ELSE IF
X$="E" THEN 240 ELSE IF X$="W" T
HEN 880 ELSE A$="THE DOOR BEHIND
 YOU IS LOCKED. REMEMBER?": GOSU
B 1530: GOTO 200
240 GOSUB 2650: A$="SCULLERY": G
OSUB 1530: GOSUB 2510: GOSUB 252
0: GOSUB 2530: DS=180: GOSUB 254
0
250 FOR V=32 TO 168 STEP 2: DRAW
 "C2;BM"+STR$(V)+",105;"+"U30;C3
;E10": NEXT V: FOR V=74 TO 104 S
TEP 2: DRAW"BM170,"+STR$(V)+";E1
0": NEXT V
260 FOR V=50 TO 75 STEP 25: CIRC
LE(V,70),10,1,.6: PAINT(V,70),1,
1: CIRCLE(V+4,65),6,,2,.6,1: NEX
T
270 FOR V=140 TO 160 STEP 20: CI
RCLE(V,70),7,4,.6: PAINT(V,70),4
,4: NEXT: CIRCLE(153,65),20,3,.9
,.5,1: FOR V=50 TO 20 STEP -1: C
IRCLE(153,V),4,3,.7,.5,1: NEXT
280 CIRCLE(128,100),30,4,.3: PAI
NT(128,100),4,4: DRAW"C4;BM105,1
25;U20E9D25": DRAW"BM145,125;U20
E9D25"
290 IF QA=0 THEN QA=1: A$="A DOU
BLE SINK, AN OLD COOK STOVE AND
A BARE TABLE.": GOSUB 1530
300 A$=W$: GOSUB 1530: GOSUB 266
0: IF HY=1 THEN 1340 ELSE IF HY=
2 THEN 950 ELSE IF HY=3 THEN 160
 ELSE A$=WA$: GOSUB 1530: GOTO 3
00
310 GOSUB 2650: A$="FLAGON ROOM"
: GOSUB 1530
320 CIRCLE(128,60),30,,2.5: DRAW
"BM99,60;H25U35R110D35G25": PAIN
T(97,55),2,3: PAINT(160,55),2,3
330 FOR V=115 TO 142 STEP 27: CI
RCLE(V,30),10,,.6: CIRCLE(V,30),
2,2: NEXT V
340 LINE(128,30)-(120,80),PSET:
LINE-(135,70),PSET: DRAW"BM120,9
0;G5H5R37G5H5": DRAW"C4;BM146,91
;D5G3F3"
350 JH$="D60L30U60R30F20G20": IF
 F1=0 THEN DRAW"C4;BM60,74"+JH$:
 PAINT(55,80),4,4
360 IF F2=0 THEN DRAW"C3;BM210,7
4;"+JH$: PAINT(190,80),3,3
370 IF PY=0 THEN A$="GOOD EEFNIN
K! I AM COUNT DRACU- NEVER MIND
MY NAME!": GOSUB 1530: PY=1
380 IF F1=1 AND F2=1 THEN A$="I'
M OUT OF FLAGONS. GO AWAY.": GOS
UB 1530: GOTO 470
```

```
390 A$="WANT A FLAGON OF POIS- I
 MEAN - DRINK AS YOU SEARCH? <Y>
ES <N>O": GOSUB 1530
400 X$=INKEY$: IF X$<>"Y" AND X$
<>"N" THEN 400
410 IF X$="N" THEN A$="GO AWAY!"
: GOSUB 1530: GOTO 470
420 A$="WHICH COLOR - <O>RANGE O
R <B>LUE?": GOSUB 1530
430 X$=INKEY$: IF X$<>"O" AND X$
<>"B" THEN 430
440 IF X$="O" AND F1=0 THEN F1=1
: FL$="ORANGE": LINE(25,73)-(85,
134),PRESET,BF: A$="YOU GOT IT.
NOW LEAVE.": GOSUB 1530: GOTO 47
0
450 IF X$="B" AND F2=0 THEN F2=1
: FL$="BLUE": LINE(170,73)-(230,
134),PRESET,BF: A$="YOU'RE WELCO
ME I'M SURE. NOW RUN BEFORE THE
FULL MOON RISES!": GOSUB 1530: G
OTO 470
460 IF X$="B" AND F2=1 THEN A$="
SURELY IT'S OBVIOUS THAT'S A FRU
ITLESS GUESS. DEPART LEST I BITE
 YOU!": GOSUB 1530: GOTO 470
470 A$=W$: GOSUB 1530: GOSUB 266
0: IF HY=1 THEN 880 ELSE A$=WA$:
 GOSUB 1530: GOTO 470
480 GOSUB 2650: A$="DINING ROOM"
: GOSUB 1530: GOSUB 2510: GOSUB
2520: DS=170: GOSUB 2540
490 DRAW"BM236,60;D31H6U25E6D5F6
G6": GOSUB 2670
500 DRAW "C2;BM60,120;U40L5U5R10
5D5L5D40L5U35L85D35L5": PAINT(62
,118),2,2
510 FOR V=60 TO 160 STEP 30: CIR
CLE(V,71),8,4,.4,1,.5: FOR U=1 T
O 4: CIRCLE(V+RND(2)-1,70),RND(5
),RND(3)+1: NEXT U,V
520 IF QZ=1 THEN QZ=0: GOTO 560
ELSE A$="THAT FOOD LOOKS GOOD. W
ANT A SNACK? <Y>ES OR <N>O.": GO
SUB 1530
530 X$=INKEY$: IF X$<>"Y" AND X$
<>"N" THEN 530 ELSE IF X$="N" TH
EN 560
540 XZ=1: FOR V=50 TO 150 STEP 3
0: A$=MID$("SLURPSNORFSCHMFGASP"
,XZ,5)+"!": GOSUB 1530: LINE(V,6
0)-(V+18,74),PRESET,BF: PLAY "T1
28;O5;CDECDE": XZ=XZ+5: NEXT
550 A$="UH-OH! ANOTHER PIGGY BEC
OMES A DINING ROOM VICTIM. THE E
ND!": KZ=1: GOSUB 1530: GOTO 261
0
560 A$=W$: GOSUB 1530: GOSUB 266
0: IF HY=3 THEN GL=2
570 ON HY GOTO 580,1140,1440,880
580 GOSUB 2650: L=0: FOR V=135 T
O 40 STEP -10
590 DRAW "BM"+STR$(L)+","+STR$(V
)+"U5R20D5L20U5E5R20G5"
600 DRAW "BM"+STR$(230-L)+","+ST
R$(V)+"U5R20D5L20U5H5R20F5"
610 PAINT(234-L,V-2),3,3: PAINT(
L+2,V-2),4,3: L=L+5: NEXT
620 LINE(68,35)-(180,135),PSET,B
: PAINT(65,133),4,3: PAINT(182,1
33),3,3
630 FOR V=80 TO 153 STEP 31: LIN
E(V,5)-(V+25,35),PSET,B: NEXT
640 IF LK=0 THEN LK=1: A$="YOU A
RE AT TWO STAIRWAYS TOPPED BY TH
REE DOORS.": GOSUB 1530
650 A$="CHOOSE <L>EFT STAIR, <R>
IGHT STAIR OR <S>OUTH.": GOSUB 1
530
660 X$=INKEY$: IF X$="" OR INSTR
("LRS",X$)=0 THEN 660
670 IF X$="S" THEN 480
680 IF FL$="ORANGE" AND X$="L" O
R FL$="BLUE" AND X$="R" THEN GOS
UB 2630: GOTO 720
690 A$="AS YOU NEAR THE TOP, THE
 ENTIRE ARRANGEMENT COLLAPSES.":
 GOSUB 1530
700 L=8: FOR K=1 TO 8: FOR V=36
TO 134 STEP L: LINE(2,V)-(253,V)
,PRESET: NEXT V: L=L-1: NEXT K
710 A$="IN YOUR NEXT LIFE, REMEM
BER THE FLAGON AND STAIR COLORS
MUST MATCH.": GOSUB 1530: GOSUB
1820: GOTO 710
720 A$="YOU ASCEND TO THE DOORS.
 OPEN <L>EFT, <M>IDDLE OR <RIGHT
>. WHICH?": GOSUB 1530
730 X$=INKEY$: IF X$="" OR INSTR
("LMR",X$)=0 THEN 730 ELSE IF X$
="M" THEN 2130
740 GOSUB 2650: FOR V=0 TO 255 S
TEP 85: LINE(V,0)-(V,135),PSET:
NEXT
750 A$="YOU SLOWLY OPEN THE DOOR
.": GOSUB 1530
760 IF X$="L" THEN GOSUB 1960 EL
SE GOSUB 1840
770 IF X$="L" AND FL$="ORANGE" O
R X$="R" AND FL$="BLUE" OR YO=0
AND X$="R" OR YO=1 AND X$="L" TH
EN 2200
780 IF X$="L" THEN YO=1: FL$=FL$
+"X": A$="A FORBODING BUT FRIEND
LY MUMMY APPEARS. IT GESTURES OV
ER THE BLUE FLAGON.": GOSUB 1530
: A$="ITS ADVICE: SHARE THE POTA
BLE WITH SOMEONE WHOSE NAME BEGI
NS AS ITS COLOR.": GOSUB 1530: G
OTO 800
790 YO=YO+1: FL$=FL$+"X": A$="A
RATTLING SKELETON IS THERE.": GO
SUB 1530: A$="IT TELLS YOU: SAY
YES TO THE LADY.": GOSUB 1530
800 A$="CONSIDERABLY WISER, YOU
DESCEND THE STAIRS WITH YOUR FLA
GON.": GOSUB 1530: GOTO 580
810 GOSUB 2650: A$="YOU GET A WH
IFF OF HAY.": GOSUB 1530
820 CIRCLE(128,65),70,,.8,.6,.1:
 CIRCLE(128,65),70,,.8,.2,.3: CI
RCLE(128,65),70,,.8,.4,.5
830 DRAW "BM185,95;D30L22H9C1L46
C3G9L22U25": CIRCLE(205,58),12,,
.7,0,.4
840 CIRCLE(55,45),20,,1,.3,.9: F
OR V=19 TO 29 STEP 10: CIRCLE(V,
65),30,,1,0,.25: NEXT: CIRCLE(48
,45),3
850 A$="AN OBESE, DIM-WITTED ELE
PHANT IS THERE.": GOSUB 1530: A$
="HAPPY TO SEE YOU, IT RUSHES FO
RWARD IN GREETING...": GOSUB 153
0
860 IF BU$="BU" THEN BU$="OK": A
$="AND FILLS THE BUCKET WITH WAT
ER FROM ITS TRUNK.": GOSUB 1530:
 A$="IT TRUMPETS: GO DOUSE SOMET
HING.": GOSUB 1530: GOTO 1340
870 PLAY "L4;O1;C;O4;L1;C": A$="
AND STEPS ON YOU. YOU FEEL MIGHT
Y LOW AS EVERYTHING ENDS.": KZ=1
: GOSUB 1530: GOTO 2610
880 GOSUB 2650: A$="DRAWING ROOM
": GOSUB 1530
890 GOSUB 2510: GOSUB 2520: DS=4
6: GOSUB 2540: GOSUB 2670
900 IF YO<3 THEN GOSUB 1680
910 X=2: FOR V=80 TO 150 STEP 2:
 DRAW "C"+STR$(X)+";BM"+STR$(V)+
",120;"+"U20E2R2E2R2E2R2U20E2R2E
2C2D40C3G5L3G5L3G5": X=X+1: IF X
=5 THEN X=2: NEXT ELSE NEXT
920 IF YO<3 THEN GOSUB 2270
930 A$=W$: GOSUB 1530: GOSUB 266
0: IF HY=3 THEN GL=1
940 ON HY GOTO 480,160,1440,310
950 GOSUB 2650: GH=0: A$="THE PA
RAPET": GOSUB 1530
960 FOR I=64 TO 129 STEP 5: N1=N
1+1: IF N1/2=INT(N1/2) THEN V=1
ELSE V=5
970 FOR G=V TO V+200+RND(20) STE
P 10: LINE(G,I)-(G+10,I+5),PSET,
B: NEXT G,I
980 FOR V=2 TO 80 STEP 2: CIRCLE
(V,63),20,4,1,.5,.75: CIRCLE(V,6
3),12,3,1.8,.77,1: NEXT
990 IF JL=0 THEN A$="AN ARCHED W
ALKWAY OPENS ON A CRUMBLING BRIC
K WALL.": GOSUB 1530: JL=2
1000 A$="IT'S HUNDREDS OF FEET D
OWN -- SOUTH, EAST AND NORTH.":
GOSUB 1530: A$=W$: GOSUB 1530: K
Z=1: GOSUB 2660
1010 KZ=0: IF HY=3 THEN 240
1020 IF GH=1 AND PA$="PA" THEN 2
550
1030 IF GH=1 THEN CIRCLE(220,33)
```

```
,10,1,.5,0,.5: CIRCLE(220,40),10
,2,.5,.5,0: A$="YOU JUMP.": GOSU
B 1530: A$="YOU FOOL!": GOSUB 15
30: FOR VB=240 TO 1 STEP -5: SOU
ND VB,1: NEXT VB: A$="THE END":
KZ=1: GOSUB 1530: GOTO 2610
1040 CIRCLE(220,60),26,2,2,.5,1:
 DRAW"C2;BM200,60;E5F5E5F5E5F5E5
F5"
1050 CIRCLE(220,33),10,,.5,0,.5:
 CIRCLE(213,25),5: CIRCLE(228,25
),5
1060 GH=1: A$="A GHOST APPEARS I
N MID-AIR, SAYING... RECONSIDER!
 GO WEST OR BE AS I!": GOSUB 153
0: GOTO 1000
1070 GOSUB 2650: A$="LABORATORY"
: GOSUB 1530: GOSUB 2510: GOSUB
2530
1080 FOR V=40 TO 80 STEP 10: FOR
 V1=100 TO 140 STEP 10: LINE(V1,
V)-(V1+10,V+10),PSET,B: NEXT V1,
V: DRAW"C1;BM60,40;R20": DRAW"BM
50,95;R40"
1090 COLOR 2,1: LINE(170,120)-(2
15,134),PSET,BF: LINE(175,70)-(2
10,119),PSET,B: COLOR 3,1: GOSUB
 1890: DRAW"C1;BM176,95;R33"
1100 DRAW"C2;BM190,90;E10H10E10H
10E10H10L63D9"
1110 A$="PROFESSOR FUDDLES PERFO
RMS UNSPEAKABLE EXPERIMENTS ON S
MALL HELPLESS AMOEBAS.": GOSUB 1
530
1120 FOR V=1 TO 100: PAINT(101+R
ND(42),43+RND(43)),RND(2)*2,3: P
SET(176+RND(34),71+RND(48),RND(2
)*2): SOUND RND(240),1: NEXT
1130 A$=W$: GOSUB 1530: GOSUB 26
60: IF HY=2 AND CV=1 THEN CV=0:
GOSUB 2100: GOTO 1070 ELSE IF HY
=3 THEN 1340 ELSE A$=WA$: GOSUB
1530: A$="THIS GIVES YOU A CHANC
E TO WATCH SOME MORE AS...": GOS
UB 1530: GOTO 1110
1140 GOSUB 2650: A$="FLAGON SPIL
LING ROOM": GOSUB 1530
1150 GOSUB 2510: FOR V=1 TO 100:
 PSET(RND(253)+2,RND(133)+2,2):
NEXT V
1160 A$="THERE ARE STRANGE SMALL
 THINGS ALL AROUND.": GOSUB 1530

1170 IF FL$<>"ORANGE" AND FL$<>"
BLUE" THEN 1290
1180 A$="THIS IS THE FLAGON SPIL
LING ROOM. YOU HAVE A FLAGON. YO
U SPILL IT.": GOSUB 1530: A$="TH
E FUMES REANIMATE MUMMIFIED SPID
ERS WHICH GROW HUGE AND ATTACK."
: KZ=1: GOSUB 1530: PCLS 1
1190 DIM A(1,25),B(7): PCLS 1: C
IRCLE(15,14),3,,.5: CIRCLE(15,10
),13,,.8
1200 FOR V=8 TO 23 STEP 5: V$=ST
R$(V)+",17;": IF V=<16 THEN J$="
G5F5" ELSE J$="F5G5"
1210 DRAW "BM"+V$+J$: NEXT V: PS
ET(11,7,4): PSET(18,7,4)
1220 GET(2,2)-(33,33),A,G: PCLS
1
1230 X=RND(7)-1: P=X*36+8: FOR J
=1 TO RND(25): B(X)=B(X)+1
1240 PUT(P,B(X))-(P+31,B(X)+25),
A
1250 IF B(X)>110 THEN 1270
1260 NEXT J: GOTO 1230
1270 A$="OH WHAT A SAD ENDING!":
 GOSUB 1530: PAINT(0,0),4,3: COL
OR 1,1: A$="E-E-E-E-E-K!": KZ=1:
 X=64: Y=160: GOSUB 1540
1280 PLAY "T1": GOSUB 1820: GOTO
 1280
1290 A$="YOU'RE VERY LUCKY . . .
 FOR SOME REASON": GOSUB 1530
1300 GOSUB 2650: A$="DIRECTION?"
: GOSUB 1530: GOSUB 2660: IF HY=
3 THEN 480 ELSE A$=WA$: GOSUB 15
30: GOSUB 2660: GOTO 1140
1310 A$="YOU WALK DIRECTLY INTO
THE FIREPLACE.": GOSUB 1530
1320 A$="YOU MUST THINK THIS TES
T IS A CINCH. FOR YOU IT'S A SIN
GE. T-H-E E-N-D": GOSUB 1530: GO
TO 2610
1330 A$="THE DOOR BEHIND YOU IS
LOCKED. REMEMBER?": GOSUB 1530:
GOTO 160
1340 GOSUB 2650: A$="GYMNASIUM":
```

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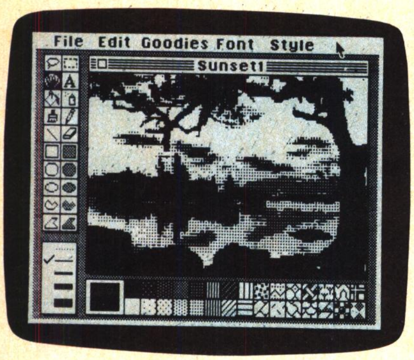
```
 GOSUB 1530: GOSUB 2510: GOSUB 2
520
1350 PAINT(228,101),3,3: DS=100:
 GOSUB 2540: GOSUB 2030: IF YO=3
 THEN GOSUB 2490: GOTO 1400
1360 IF BU$="BU" AND SD=0 THEN S
D=1: A$="BLURTON SAYS: GO SEE TH
E ELEPHANT.": GOSUB 1530: GOTO 1
400
1370 IF VX=0 THEN VX=1: A$="SMIR
KING BUT SILENT, BLURTON SHARPE
PRACTICES HIS PISTOL SKILL.": GO
SUB 1530
1380 GOSUB 2490
1390 E$=LEFT$(FL$,1): IF E$="B"
OR E$="O" THEN GOSUB 2440
1400 A$="DIRECTION?": GOSUB 1530
: GOSUB 2660: IF PI$="" AND HY=1
 OR PI$="" AND HY=3 THEN A$="YOU
 ENTER SHARPE'S LINE OF FIRE, AN
D HE PLUGS YOU. THE END.": GOSUB
 1530: GOTO 2610
1410 IF PI$="EMPTY" AND HY=1 THE
N 810
1420 IF PI$="EMPTY" AND HY=3 THE
N A$=WA$: GOSUB 1530: GOTO 1400
1430 IF HY=4 THEN 240 ELSE IF HY
=2 THEN 1070
1440 GOSUB 2650: FOR V=1 TO 79 S
TEP 3: CIRCLE(128,55),V,RND(2)+2
: NEXT V
1450 A$="THIS MEANS JUMPING THRO
UGH A BEAUTIFUL STAINED GLASS WI
NDOW. <Y>ES OR <N>O": GOSUB 1530

1460 X$=INKEY$: IF X$<>"Y" AND X
$<>"N" THEN 1460 ELSE IF X$="N"
AND GL=2 THEN 560 ELSE IF X$="N"
 AND GL=1 THEN 930
1470 DRAW"C2;BM128,40;U30G10D20H
30D10F20L30F20G30R5U5R13U5E20F40
U10R40H40U30G20": PAINT(128,65),
1,2
1480 FOR X=255 TO 1 STEP 10: SOU
ND X,1: NEXT: A$="YOU JUMP": GOS
UB 1530
1490 IF PA$="PA" THEN A$="YOUR P
ARACHUTE RIPS ON JAGGED GLASS AN
D IS USELESS.": GOSUB 1530
1500 A$="IT'S THE END. YOU FALL
. . .": GOSUB 1530
1510 A$="... AND FALL ...": GOSU
B 1530: GOSUB 1820: GOTO 1510
1520 IF FI=2 THEN DRAW"C3;BM200,
74"+JH$: PAINT(180,80),3,3
1530 COLOR 3,1: X=1: Y=140: A$=A
$+CHR$(32)
1540 FOR P=1 TO LEN(A$): Q$=MID$
(A$,P,1)
1550 K=ASC(Q$)-31: IF K<1 OR K>5
9 THEN 1590
1560 ON K GOSUB 4,5,6,7,8,9,10,1
1,12,13,14,15,16,17,18,19,20,21,
22,23,24,25,26,27,28,29,30,31,32
,33,34,35,36,37,38,39,40,41,42,4
3,44,45,46,47,48,49,50,51,52,53,
54,55,56,57,58,59,60,61,62
1570 GOSUB 63: X=X+12: IF Q$=CHR
$(32) AND INSTR(MID$(A$,P+1,INT(
(255-X)/12)),CHR$(32))=0 THEN X=
1: Y=Y+14
1580 IF Y>182 THEN GOSUB 2630
1590 NEXT P: GOSUB 2630: RETURN
1600 CIRCLE(128,90),55,,1.5,.6,.
09
1610 FOR V=120 TO 128: FOR U=110
 TO 170 STEP 60: CIRCLE(U,V),15,
,.2: NEXT U,V
1620 CIRCLE(155,75),18,,2.5,.5,1
: DRAW"BM137,75;R30": CIRCLE(157
,75),13,,1,0,.5: CIRCLE(85,97),1
1,,1,0,.5
1630 DRAW "BM155,120;H15G15L20H8
U15L20U22"
1640 CIRCLE(100,62),30,,.8
1650 FOR V=90 TO 110 STEP 20: CI
RCLE(V,55),9,,.7: CIRCLE(V,58),3
: NEXT
1660 DRAW "BM101,55;D3G7D5F3R2E5
U2"
1670 LINE (97,80)-(107,77),PSET:
 RETURN
1680 COLOR 2,1: CIRCLE(200,130),
20,,3,.5,0: LINE(180,130)-(220,1
30),PSET
1690 DRAW "BM195,75;U6L1H3U6E3R3
F4E4R2F3D6G3D6G3"
1700 LINE(200,120)-(200,70),PRES
ET: PAINT(200,112),2,2
1710 CIRCLE(200,40),9,,1.6: CIRC
LE(200,66),16,,1.1,.35,.16: PAIN
T(200,40),1,2
1720 PSET(198,37,3): PSET(202,37
,3): CIRCLE(200,41),1: CIRCLE(20
0,44),2,,.7,0,.5
1730 COLOR 4,0: FOR V=10 TO 14:
CIRCLE(200,46),V,,1.7,.5,1: NEXT
: COLOR 3,0: RETURN
1740 PMODE 4,1: COLOR 1,0: PCLS0
: SCREEN 3,2
1750 DRAW"BM0,134;E10R3U2E5R40U3
R50U3R150"
1760 LINE(116,110)-(90,30),PSET
1770 DRAW"BM90,30;L10U10R40D10L1
0D10R40U10L5U5R15D5L5D10R30U20L1
0U8R30D8L10D20R40"
1780 LINE-(220,111),PSET
1790 FOR V=1 TO 12: CIRCLE(180,1
11),V,,2,.5,1: NEXT
1800 FOR V=1 TO 10: CIRCLE(30,20
),V: NEXT
1810 KZ=1: A$=STRING$(9,32)+"LUR
KLEY MANOR"+STRING$(11,32)+"BY R
ICHARD RAMELLA": GOSUB 1530: KZ=
0
1820 POKE 65494,0: POKE 223,6: F
OR G=1 TO 2: FOR T=1 TO 2: PLAY
P1$: NEXT T: PLAY P2$: IF G=1 TH
EN PLAY P3$ ELSE PLAY P4$
1830 NEXT G: POKE 65495,0: RETUR
N
1840 PAINT(220,5),3,3: COLOR 1,3
: CIRCLE(210,16),11,,1.5,.45,.05
6: CIRCLE(210,19),9,,2.2,0,.5
1850 PSET(208,11,1): PSET(213,11
,1): DRAW "BM210,16;D3": DRAW "B
M209,24;R4"
1860 DRAW "BM190,69;U10R3U17E5R2
5E15U3H10": DRAW "BM210,34;D40"
1870 V1=14: V2=.7: V3=47: FOR V=
1 TO 5: CIRCLE(210,V3),V1,,V2,.4
5,.05: V1=V1-2.5: V2=V2-.1: V3=V
3+5: NEXT V
1880 FOR V=67 TO 70: CIRCLE(210,
V),14,,.6,0,.5: NEXT: DRAW"BM188
,132;E7U10H3U30E7R20F20G20F7": R
ETURN
1890 CIRCLE(70,90),25,,1.5,.45,.
99: CIRCLE(80,90),25,,1.5,.5,.6:
 CIRCLE(53,95),7
1900 DRAW"BM48,103;D15G5R10E2R5E
10"
1910 CIRCLE(68,85),18,,1.6,.75,.
25
1920 CIRCLE(70,47),15,,1.2: DRAW
 "BM80,51;L4H2": CIRCLE(76,41),3
,,.7
1930 FOR V=5 TO 16: CIRCLE(72,47
),V,,1.2,.5,.7: NEXT V
1940 DRAW "BM63,120;D14R17E2U4H2
L5U5E2U5E7U2E7U3E2U1E2U7L9": PAI
NT(65,132),3,3
1950 PAINT(70,100),4,3: RETURN
1960 FOR V=21 TO 145 STEP 1: LIN
E(6,V+(RND(10)-20))-(75,V+RND(10
)-20),PSET: NEXT V: COLOR 3,0
1970 COLOR 2,0: DRAW "BM35,80;D5
0L20U10R10U80G10D30L10U35E20R5"
1980 CIRCLE(39,17),14,,1,.4,.12
1990 DRAW "BM35,80;R10D50R20U10L
10U80F10D30R10U35H20L5"
2000 LINE(0,0)-(85,135),PSET,B:
PAINT(5,5),4,2: PAINT(5,5),1,2
2010 COLOR 3,0: LINE(0,0)-(85,13
5),PSET,B: PAINT(5,5),1,3
2020 RETURN
2030 COLOR 2,1
2040 DRAW"BM202,130;L13E4R5U75G1
2H15R7F7E11R20F15G15U7E7H9D75G8L
3U4E6R4L13R7U40": DRAW "BM199,70
;R15"
2050 PAINT (202,68),2,2: PAINT (
202,72),4,2
2060 CIRCLE(206,33),10,,1.3: PAI
NT(206,33),0,2: PAINT(206,33),1,
2: COLOR 2,0: FOR V=1 TO 10: CIR
CLE(206,28),V,,.8,.5,1:NEXT V: C
OLOR 3,0
2070 DRAW "BM203,37;F2R3E2": DRA
W"BM207,36;U4": PSET(202,30,3):
PSET(209,30,3)
2080 DRAW"BM173,47;U1L10U1R13E2G
3D7"
2090 DRAW"BM10,125;U5E5U50L5D15L
3U20R10U10R10D10R10D20L5U15L5D38
F3G10U25": RETURN
2100 GOSUB 2650: BU$="BU": A$="D
UNGEON": GOSUB 1530: GOSUB 2510:
 A$="IT'S EMPTY EXCEPT FOR...":
GOSUB 1530
2110 DRAW"C2;BM195,103;R20D30L20
U30": PAINT(197,105),2,2: CIRCLE
(205,103),10,2,.5,1: A$="A NICE
LITTLE BUCKET": GOSUB 1530
```

CoCo Max

This is one of those rare programs that will captivate everyone in your family.... No one can see CoCo Max and not want to try it!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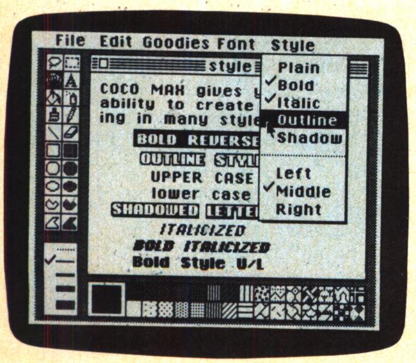
We are all witnessing an exciting revolution in microcomputers: a radically new kind of computer and software that opens a whole new world of creative power to computer users.

It was inevitable that this exciting approach would be brought to the CoCo. With this in mind, Colorware chose to go all out and maximize this new concept for the color computer. That meant designing not just software but hardware too. It meant thousands of hours of pure machine language programming. Rarely has this much effort been applied to one product for the Color Computer.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style
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COCO MAX gives y… ability to create … ing in many style…

BOLD REVERSE

OUTLINE STYL…

UPPER CASE

lower case

SHADOWED LETTE…

ITALICIZED

BOLD ITALICIZED

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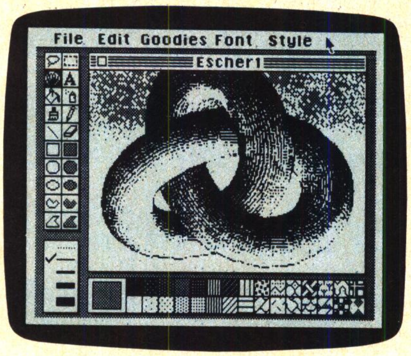
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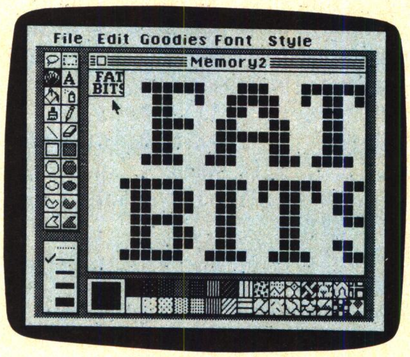
UNMATCHED CAPABILITY...

Because we took the maximum approach: highly optimized machine code combined with hardware, CoCo Max truly stands above the rest as the ultimate creative tool for the Color Computer. It's unrivaled performance lets you create with more brilliance and more speed than any similar system – much more than you ever imagined possible. And, you can do it in black & white or color.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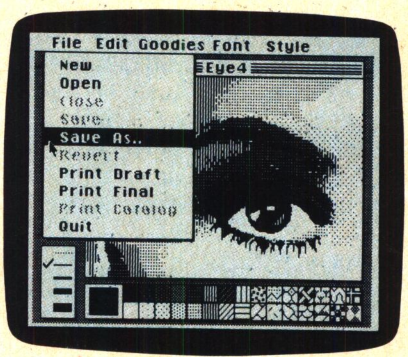
Memory2
FAT BITS
FAT
BITS

All the sophisticated power of the bigger systems is there: ***Icons, Pull-Down Menus,*** full ***Graphic Editing, Font Styles,*** and all kinds of handy tools and shortcuts.

Plug your joystick, mouse or touch pad into CoCo Max's Hi-Res Input Unit. Then use a delightfully simple ***Point-and-Click*** method to get any of CoCo Max's powerful graphic tools. It has them all: You can ***Brush, Spray*** or ***Fill*** with any ***Color, Shading*** or ***Pattern.*** Use ***Rubber Band Lines*** and ***Shapes*** (square, rectangle, circle, elipse, etc.) to create perfect illustriations with speed and ease. There's a ***Pencil,*** an ***Eraser*** and even a selection of ***Caligraphy Brushes.*** And, as you can see, CoCo Max can do a lot with text.
All of the newest special effects are there: ***Trace Edges, Flip, Invert, Brush Mirrors,*** etc. And all of the very latest super-capabilities like: ***Undo,*** which automatically reverses your mistakes, and ***Fat Bits*** which zooms you way in on any part of your subject to allow dot-for-dot precision.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Eye4
New
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Close
Save
Save As..
Revert
Print Draft
Print Final
Print Catalog
Quit

THE BIG PICTURE

The large image box in the middle of the CoCo Max screen is actually only a window on an even larger image. Use the Point-and Click "Hand" to effortlessly move your window over any portion of the larger image. You have a working area of up to 3-½ times the area of the window itself.

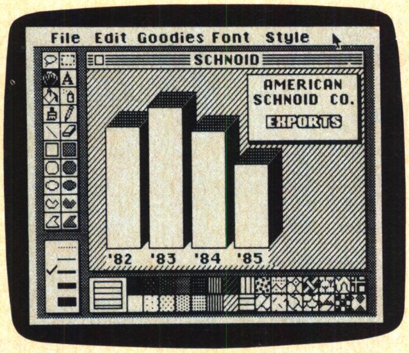
FLEXIBLE PRINTING...

CoCo Max gives you many ways to print. Fill a whole page with your image or condense two full CoCo screens to less than ¼ page for a finely detailed copy. "Dump" your CoCo Max screen full size or shrink it to ⅛ page size.

THE COCO MAX SYSTEM

FREEDOM TO CREATE...

Anyone who wants to create anything at all on their CoCo screen or printer will certainly be very glad to meet CoCo Max. CoCo Max's friendly yet sophisticated graphic and text capabilities let you almost instantly produce illustrations, diagrams, charts,



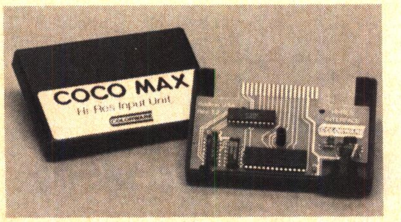
graphs, and computer art – for serious use or just for creative fun.

AN ABSOLUTE GUARANTEE

CoCo Max is a hardware/software system that no software-only system can match. Get CoCo Max and see your CoCo perform as it never could before. If you don't agree that CoCo Max is the ultimate creative tool for the Color Computer, simply return it within 20 days for a full, courteous refund from Colorware.

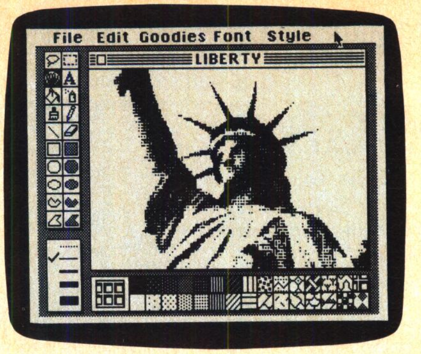
THE HARDWARE...

This is the key to CoCo Max's unmatched performance. Did you know the normal joystick input built into the Color Computer only allows access to 4,096 (64 x 64) points on the CoCo screen? Yet, the Color Computer's high resolution screen



has 49,152 (256 x 192) pixels. This means that a joystick, mouse or even a touch pad can, at best, only access about one tenth of the pixels on the CoCo screen.

Most graphic programs ignore this hardware limitation of the Color Computer and give you only low-res control. Others attempt to overcome the limita-

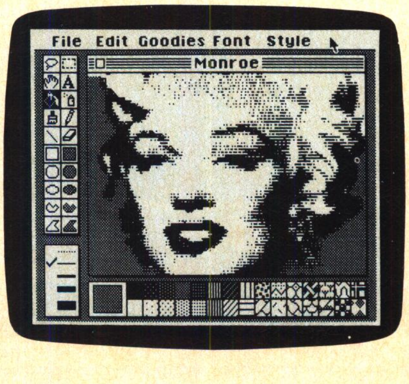


tion by using software schemes such as sliding windows. Although clever, these schemes yield sluggish and awkward results. Only CoCo Max does it the right way. The CoCo Max Hi-Res Input Unit plugs into your ROM slot and adds an entirely new joystick input to your computer – a precision one with a 49,152 point resolution to match the CoCo screen exactly.

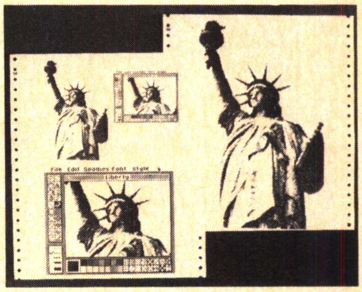
Plug your same joystick, mouse or touch pad into this new input and you have a whole new kind of control. The difference is remarkable.

A DIGITIZER OPTION...

We studied all the video digitizers available and picked the best of them to link with CoCo Max. The DS-69 from Micro Works was our choice. This optional device lets you capture the image from any video source (video recorder, camera, etc.) on your Color Computer.



You may then use CoCo Max's graphic magic on it. The DS-69 is available as an option from Colorware from $149.95 complete with its own software on disk or tape. Using the DS-69 with a disk requires an RS multi-pak adaptor.



COCO MAX REQUIREMENTS

The CoCo Max System includes the Hi-Res Input Unit, software on disk or cassette (please specify) and user manual. It will work on any 64K Extended or non-extended Color Computer. You'll need a Radio Shack or equivalent joystick, mouse or touch pad. Disk systems require a Multi-Slot Interface or Y-Branching Cable.

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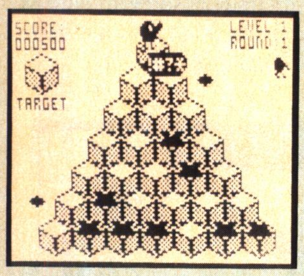

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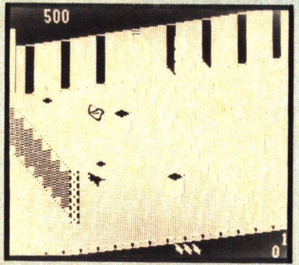

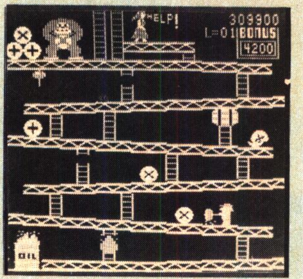

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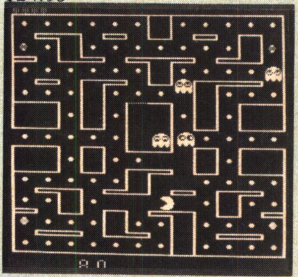

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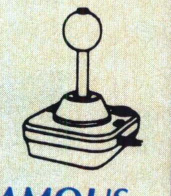

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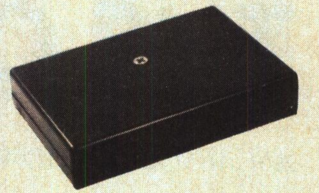

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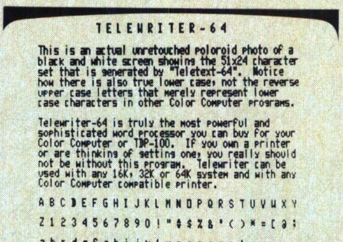

```
TELEWRITER-64

This is an actual unretouched poloroid photo of a
black and white screen showing the 51x24 character
set that is generated by "Teletext-64". Notice
how there is also true lower case, not the reverse
upper case letters that merely represent lower
case characters in other Color Computer programs.

Telewriter-64 is truly the most powerful and
sophisticated word processor you can buy for your
Color Computer or TDP-100. If you own a printer
or are thinking of getting one, you really should
not be without this program. Telewriter can be
used with any 16K, 32K or 64K system and with any
Color Computer compatible printer.

A B C D E F G H I J K L M N O P Q R S T U V W X Y
Z 1 2 3 4 5 6 7 8 9 0 ! " # $ % & ' ( ) * = [ @ ;
a b c d e f g h i j k l m n o p q r s t u v w x y
z , . / ; < > ? + ! " # $ % & ' ( ) * : = - █
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3. ***'TALKING BLACKJACK'***- Play for big stakes against a rather talkative casino dealer.

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Other features include software controlled pitch, unlimited vocabulary text-to-speech, and even a program that will recite any ASCII file (such as from Telewriter-64 & other word processors). You also get Colorware's unique full-screen phoneme editor program that let's you experiment with and modify speech at it's most fundimental level.

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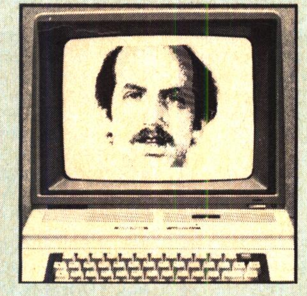
If you have a 'Real Talker', do not deprive yourself of this absolutely incredible machine-language Talking Head simulation program. While other talking head simulations use a minimal cartoon-like face, TALKHEAD uses high resolution, full-screen, digitized images of an actual person's face to create a life-like animated effect.



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```
2120 YO=YO+1: A$="YOU TAKE THE B
UCKET AND CRAWL BACK UP TO...":
GOSUB 1530: RETURN
2130 COLOR 3,1: L=1: FOR V=35 TO
 59: FOR K=3 TO 1 STEP -2
2140 COLOR K,1: LINE(111+L,V)-(1
37,35),PSET: NEXT K: L=L+1: NEXT
 V: COLOR 3,1
2150 A$="OH MY GOODNESS! A TRAPD
OOR OPENS AND DROPS YOU THROUGH.
": GOSUB 1530: A$="BUT DON'T WOR
RY TOO MUCH.": GOSUB 1530
2160 CIRCLE(136,96),40,2,1,.77,.
47: X$="C2;BM136,96": DRAW X$+"G
5H5G5H5G5H5G5": DRAW X$+"H5E5H5E
5H6E6H6R6"
2170 CIRCLE(150,75),10,2,.5: PAI
NT(128,133),2,2: CIRCLE(150,75),
2,4,.7
2180 A$="A RENEGADE FROM SOME GE
NTLER VIDEO PASTIME CATCHES YOU
BEFORE YOU HIT THE FLOOR.": GOSU
B 1530: A$="IT HAS EATEN RECENTL
Y BUT MANAGES TO PAC YOU IN. THE
 END": GOSUB 1530
2190 GOSUB 1820: GOTO 2190
2200 IF X$="L" THEN V=2 ELSE V=1
82
2210 IF X$="L" THEN A$="A MUMMY
APPEARS, SAYING . . .": GOSUB 15
30: A$="I AM ENRAGED BY THE ORAN
GE OF YOUR FLAGON!": GOSUB 1530
2220 IF X$="R" THEN A$="THERE'S
A SKELETON IN THE CLOSET. IT SAY
S . . .": GOSUB 1530: A$="YOU CA
ME HERE TOO SOON, YET YOU ARE NO
W... THE LATE.": GOSUB 1530
2230 A$="YOU TAKE A PERMANENT PL
ACE ON THE OTHER SIDE OF THE MID
DLE DOOR.": GOSUB 1530
2240 CIRCLE(128,95),38,,2,.5,1:
X=107: Y=70: A$="R I P ": GOSUB
1540
2250 COLOR 2,1: FOR X=90 TO 166:
 LINE(X,100)-(X+(3-RND(6)),100-R
ND(15)),PSET: NEXT X: COLOR 3,1:

2260 A$="IT LEADS TO A SECLUDED
GLEN JUST BEHIND LURKLEY MANOR.
YOUR FINAL STOP.": KZ=1: GOSUB 1
530: GOTO 2610
2270 A$="NOIRA DARK ASKS IF YOU
HAVE SOMETHING TO DRINK. <Y>ES O
R <N>O.": GOSUB 1530
2280 X$=INKEY$: IF X$<>"Y" AND X
$<>"N" THEN 2280
2290 IF X$="N" AND FL$="" THEN A
$="DON'T FORGET ME.": GOSUB 1530
: RETURN
2300 IF X$="N" AND FL$<>"" OR X$
="Y" AND FL$="" THEN A$="SHE CAL
LS YOU A LIAR, AND RIGHTLY SO. S
HE FLIES INTO A RAGE.": GOSUB 15
30: GOTO 2370
2310 A$="SHE ASKS FOR A DRINK: <
Y>ES OR <N>O.": GOSUB 1530
2320 X$=INKEY$: IF X$<>"Y" AND X
$<>"N" THEN 2320
2330 IF X$="Y" AND LEFT$(FL$,2)=
"BL" THEN A$="IT'S BLUE! I HATE
PRUNE JUICE, OR WHATEVER IT IS!"
: GOSUB 1530: GOTO 2370
2340 IF X$="Y" AND FL$="ORANGE"
THEN A$="SHE SNIFFS AT IT, SAYIN
G: THE SKELETON MUST OKAY THIS F
IRST.": GOSUB 1530: RETURN
2350 IF X$="Y" AND FL$="ORANGEX"
 THEN FL$="": YO=3: CV=1: A$="TH
AT TASTED VERY GOOD! MY ADVICE T
O YOU GO WALK THROUGH A WALL.":
GOSUB 1530: RETURN
2360 IF FD=0 AND X$="N" THEN FD=
1: A$="SHE VOWS: YOU'LL SLAKE MY
 THIRST BEFORE YOU ESCAPE! SCRAM
!": GOSUB 1530: RETURN ELSE IF X
$="N" THEN A$="REMEMBER MY VOW."
: GOSUB 1530: RETURN
2370 COLOR 2,1: CIRCLE(200,66),1
6,1,1.1,.35,.67
2380 DRAW"BM190,52;L15H9L7F14R15
F2": CIRCLE(163,40),8,,.7: PAINT
(163,40),1,2: DRAW"BM163,10;D25"

2390 A$="SHE PRODUCES A BOMB.":
GOSUB 1530
2400 FOR X=10 TO 35: FOR V=4 TO
1 STEP -1: COLOR V,1: CIRCLE(163
,X),2,V: NEXT V: PLAY "T254;01;C
": NEXT X
```

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```
2410 COLOR 4,1: FOR X=1 TO 60: F
OR V=0 TO 1: SCREEN 1,V: LINE(16
3,40)-(RND(255),RND(134)),PSET:
NEXT V,X: COLOR 3,1
2420 A$="NO ONE SURVIVES. WILL T
HIS TEACH YOU NOT TO FIB?": KZ=1
: GOSUB 1530: PLAY "T1"
2430 GOSUB 1820: GOTO 2430
2440 A$="BLURTON SAYS: I SEE YOU
 HAVE A FLAGON. MAY I HAVE A SIP
 - <Y>ES OR N<O>?": GOSUB 1530
2450 X$=INKEY$: IF X$<>"N" AND X
$<>"Y" THEN 2450 ELSE IF X$="Y"
AND FL$="BLUE" THEN A$="SEE MY M
OMMY - I MEAN MY MUMMY - TO GET
THIS APPROVED BEFORE I DRINK IT.
": GOSUB 1530: RETURN
2460 IF X$="Y" AND LEFT$(FL$,2)=
"OR" THEN A$="IT'S ORANGE STUFF,
 WHICH I HATE!": GOSUB 1530: A$=
"HE FIRES. YOU FALL. IT ENDS.":
GOSUB 1530: GOTO 2610
2470 IF X$="N" THEN A$="BLURTON
SCOWLS: NO ONE REFUSES ME. I'M A
 BLUEBLOOD!": GOSUB 1530: A$="HE
 AIMS THE PISTOL AT YOU AND FIRE
S! THE END.": GOSUB 1530: GOSUB
2490: GOTO 2610
2480 A$="BLURTON DRAINS THE FLAG
ON AND KEEPS IT.": GOSUB 1530: A
$="HE SAYS: I LIKE IT. I PROMISE
 NEVER TO SHOOT YOU.": GOSUB 153
0: FL$="": PI$="EMPTY": RETURN
2490 FOR V=1 TO 10: CIRCLE(159,4
5),3,4: POKE 65494,0: PLAY"T32;O
5;CB"
2500 CIRCLE(159,45),3,1: CIRCLE(
8+RND(20),60+RND(20)),3,4: NEXT:
 POKE 65495,0: RETURN
2510 LINE(40,40)-(215,95),PSET,B
: LINE(40,40)-(0,0),PSET: LINE(2
15,40)-(255,0),PSET: LINE(215,95
)-(255,135),PSET: LINE(40,95)-(0
,135),PSET: RETURN
2520 DRAW"BM225,105;U50E20D90":
PAINT(228,101),2,3: RETURN
2530 DRAW"BM30,105;U50H20D90": P
AINT(27,100),2,3: RETURN
2540 LINE(DS,50)-(DS+30,95),PSET
,B: PAINT(DS+2,52),2,3: RETURN
2550 GOSUB 2650: CIRCLE(200,80),
12,4: PAINT(200,80),4,4: LINE(1,
120)-(1,120),PSET: FOR V=1 TO 25
5 STEP RND(15)+10: N=N+1
2560 N=N+1: IF N/2=INT(N/2) THEN
 V1=80+RND(20) ELSE V1=100+ RND(
20)
2570 LINE-(V,V1),PSET: NEXT: LIN
E-(254,120),PSET: PAINT(2,134),3
,3: DRAW"C2;BM40,100;U30R10D10R3
0U10R10D30L50": PAINT(43,98),2,2

2580 A$="IT IS DAWN AS YOU ESCAP
E LURKLEY MANOR. YOU ARE VERY HA
PPY": GOSUB 1530: GOTO 2580
2590 GOSUB 2600: GOSUB 2650: GOS
UB 1600: A$="IT'S IGOR! HARUMPH!
 NEVER HOPED-- I MEAN EXPECTED T
O SEE YOU AGAIN.": GOSUB 1530: A
$="I GIVE YOU A PARACHUTE. USE I
T WELL. I NOW RETURN YOU TO THE
GREAT HALL.": GOSUB 1530: GOTO 1
60
2600 A$="UP THE CHIMNEY YOU FIND
 THE ATTIC. SOME WEIRDNESS HAPPE
NS - A COLOR FIELD...": GOSUB 15
30: FOR V=1 TO 20: PCLS RND(3)+1
: SCREEN RND(2),1: NEXT: GOSUB 2
650: RETURN
2610 PLAY "T1": GOSUB 1820: GOTO
 2610
2620 LINE(S1,P1)-(S2,P2),PRESET,
BF: RETURN
2630 IF KZ=1 THEN KZ=0: RETURN E
LSE FOR T=1 TO 500: NEXT: COLOR
1,1: LINE(0,140)-(255,Y+12),PRES
ET,BF
2640 X=1: Y=140: COLOR 3,1: RETU
RN
2650 PMODE 3,1: COLOR 3,0: PCLS1
: SCREEN 1,1: LINE(0,0)-(255,135
),PSET,B: RETURN
2660 X$=INKEY$: HY=INSTR(DI$,X$)
: IF X$="" OR HY=0 THEN 2660 ELS
E RETURN
2670 FOR V=1 TO 15: CIRCLE(22,60
),V,RND(2)+2,1.8: NEXT V: RETURN

2680 REM - END OF LISTING
```

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Constructing 16K Of EPROM For Your Disk Controller

By Tony DiStefano
Rainbow Contributing Editor

A lot of people call or write to me with suggestions about doing this and trying that, and I plan to start doing some of them soon. Some of the most popular ones are quite good, but I'll not mention them right now. I wouldn't want to say something and not live up to it later.

I would like to apologize to my readers for the errors that sometimes appear in "Turn Of The Screw." You see, all of the projects that appear in this article, I have built, tested and debugged. The biggest problem is when it is time to write the article, I have to take my prototype and transfer all the hardware information into type. That means diagrams, parts lists, text and schematics. This is where I am most vulnerable to errors. Once I have finished the rough draft, I read it over again, then when all is completed, I read the whole thing once more. Errors, however, do creep in; please bear with me, I do my best.

If, when constructing one of my projects, you do come across something that does not seem right, don't continue. Stop and study the situation. If you don't come to a solution, contact me either by letter (include a SASE) to THE RAINBOW, or by calling me on any Monday night at (514) 473-4910. Never try to do something unless you are sure of what you are doing. Be forewarned, the computer is not very forgiving. One error can cause a lot of damage. I know, I have burnt out a few chips in my time and occasionally still do.

Now to get to this month's topic. One of the memory mapped areas I described in last month's article is the area reserved for the cartridge ROM pack. I also said that when you plugged in the disk controller, the Disk Operating System (Disk BASIC) used this area. This month, we will look into expanding Disk BASIC hardware.

To recap this area, the *CTS pin on the controller controls the ROM chip that contains the disk software. The *CTS select line can access a total of 16,128 bytes. (Better known as 16K.) It is memory mapped from 49,152 ($C000) to 65,279 ($FEFF).

The ROM that Radio Shack uses in Disk BASIC is only 8K long, the lower 8K, from 49,152 ($C000) to 57,343 ($DFFF). All references to the "lower 8K" will be at this address. That leaves the upper 8K, from 57,344 ($E000) to 65,279 ($FEFF), of unused memory. All references to the "upper 8K" will be this area.

Actually, this memory is not unused. It is memory mirrored to the lower 8K. This means it is not properly decoded and when the upper 8K accesses, the lower 8K chip responds. For example, type in:

```
PRINT PEEK(49152) ENTER
```

and

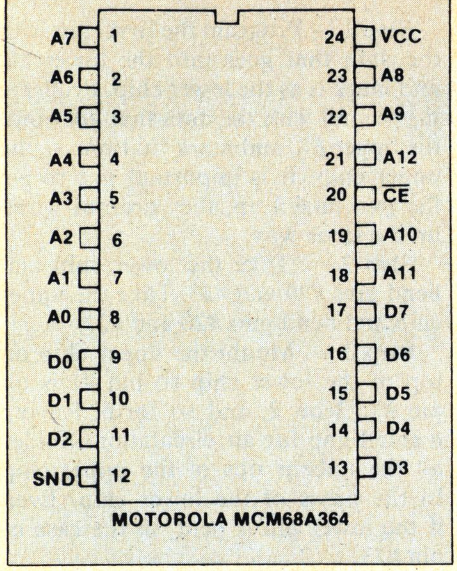
```
PRINT PEEK(57344) ENTER
```

Both responses will be the same. Now, if we were able to properly decode this area, we could use the free space to add another chip, usually an EPROM. This chip could be used as an extension of Disk BASIC or often-used utilities.

For example, the Spectrum DOS, by Spectrum Projects, could be burned into EPROMs, and whenever you turned the computer on, it would be

(Tony DiStefano is well-known as an early specialist in computer hardware projects. He lives in Laval Ouest, Quebec.)

Figure 1



right there. (I will not go into how to work with or use EPROM programmers. There are several on the market and all seem to be good; it all depends on price and ease of use. Usually the more you pay, the easier it is to use. I will leave the software programming up to you.)

What I intend to do in this article is describe the chip that is in the Radio Shack controller when you buy it, and the way you can interface two 8K EPROMs or one 16K EPROM.

The 8K EPROM I will use is the Intel 2764; it is the most economical one I have found. The 16K EPROM is the Intel 27128 (a little more expensive, but a little less trouble). Other manufacturers make the same chip, but make sure it is the Intel pinout as opposed to the TI pinout. You can use the TI pinout chip, but you'll have to figure out the pinout changes for yourself. Another note: If you like to use the high speed poke, for `POKE 65495,0` you must use a 300 ns. access time chip, or faster, in order for it to work. The slower 450 ns. chip works in the regular mode, but not at the faster rate.

Now, the chip that contains the Disk BASIC software is made by Motorola. This chip is a masked ROM — ROM means Read Only Memory. That means the data contained in this chip can never be changed, erased or lost (unless you burn out the chip). The data is permanently printed directly on the chip itself at the time of production. It costs less to produce a ROM as long as the quantity is high.

The chip used here is an MCM68A364. It is an 8K by 8 ROM. Figure 1 shows the pinout of this chip. By the way, the BASIC and Extended BASIC chips are also the same chip, just different masks.

The first way of using all of the 16K memory in the cartridge area is to use a 16K EPROM. Figure 2 shows the pinout of an Intel 27128 EPROM. Examine the diagram and compare it to Figure 1.

What is wrong with this picture? There are 28 pins on this chip. The 8K ROM has only 24. This is a bit of a problem, but certainly not unsurmountable. It's time to get the ol' soldering iron and wire out. The following is a step-by-step procedure to modify and solder up a 27128 EPROM to fit (kind of) into a 24 pin socket. I recommend only those experienced in soldering attempt this.

The first thing we must do is study the pinout for this chip. Examine Figure 2, the Intel 27128 chip. The first thing we notice is that it has 28 pins, four more than the socket. Pin numbers 1, 2, 27 and 28 are the odd ones. If you line up pin #3 of the EPROM and pin #1 of the ROM, the rest of the pins are almost the same as the ROM. The different pins between an Intel 27128 and an MCM68A364 are as follows:

Pin #	EPROM	ROM
1 (-)	Vpp	N/C
2 (-)	A12	N/C
20 (18)	CE	A11
22 (20)	OE	CE
23 (21)	A11	A12
26 (24)	A13	Vcc
27 (-)	PGM	N/C
28 (-)	Vcc	N/C

When it is time to insert this chip into the 24 pin socket, let the odd pins hang out. Pin #3 on the IC will plug into pin #1 on the socket. Make sure you get pin #1 right. It is usually marked with a small hole or a notch.

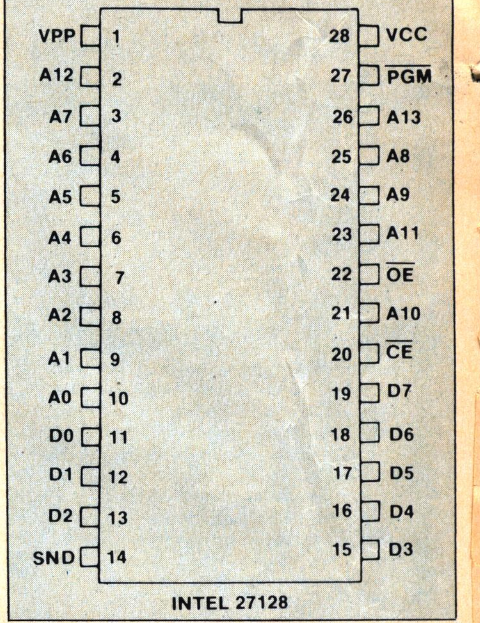
Step 1 — Bend pins #20, #23 and #26 (on the IC) out far enough so when you insert the chip these pins will not enter the socket. Make sure it does not touch anything.

Step 2 — Solder a short piece of #30 wire from pin #20 to pin #22 on the IC.

Step 3 — Solder another piece of #30 wire from pin #1 to pin #28 and pin #27 on the IC.

Step 4 — Solder one end of a one-inch piece of #22 wire to pin #28 on the IC. Strip ⅛ inch of insulation from the other end. This end will insert into the empty pin #24 of the socket.

Figure 2



Step 5 — Solder one end of a two-inch piece of #22 wire to pin #2 on the IC. Strip ⅛ inch of insulation from the other end. This end will insert into the empty pin #21 of the socket.

Step 6 — Solder one end of a one-inch piece of #22 wire to pin #23 of the IC. Strip ⅛ inch of insulation from the other end. This end will insert into the empty pin #18 of the socket.

Step 7 — Solder one end of a four-inch piece of #30 wire to pin #26 on the IC. Solder the other end of this wire to pin #37 on the edge connector, the side that plugs into the computer. That is the second to last pin closest to you on top, on the right-hand side if you are looking at the front of the controller.

That's it! Carefully insert the chip into the socket making sure there are no shorts. You now have a 16K EPROM in your controller. If you want to erase this EPROM, just remove all of the solder spots and start over again. If you do a good job in soldering and de-soldering, the EPROM could stand about 10 or so recyclings.

If you don't want to use a 16K EPROM, or your present programmer cannot handle 16K chips, then using two 8K EPROMs is the answer. There are two problems with using two 8K EPROMs. The first problem is how to decode the two separate chip select lines and the last address line. Figure 3 shows the pinout of an Intel 2764.

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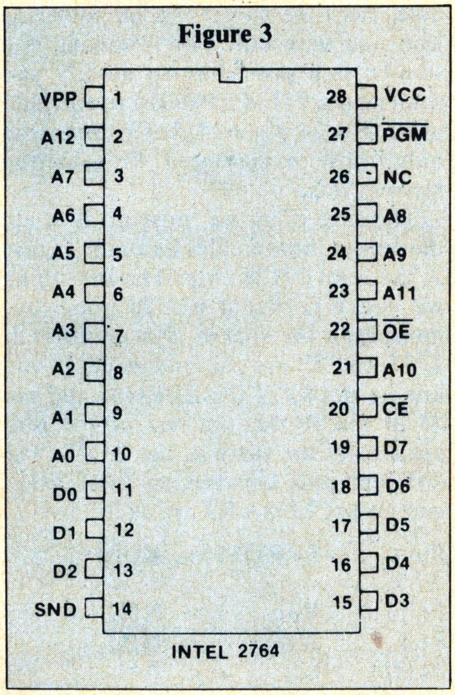
Notice that pin #27 is the pin used in the programming of this chip. However, if this pin is low during a read cycle, the chip "deselects" — the chip does not respond to a read. It stays deselect all the time this pin is low. If we were to attach the last address line to it (A13) when this line was low, the chip would not activate. The fact that A13 is low means you are accessing the lower 8K block. Since the chip deactivates when it is low, it meets the decoding needs of the upper block.

Figure 3



On the other hand, pin #20 of the is made to activate the chip when low. So, if we tied A13 to this line, the chip would behave opposite to the first. It would be deactivated when A13 is high. This would properly decode for the lower 8K block and deactivate for the upper.

Using this technique would solve our first problem, but we still have one more problem: Where to put the second chip? I have used this technique before and most likely I'll use it again — it's great. It is called the "piggyback" technique. We will solder the two chips on top of each other, except A13 and a few more, to get it to fit in a 24 pin socket.

Before we go any further here, there is a difference between an Intel 2764 and an Intel 27128: The 2764 has an N/C on pin #26, whereas the 27128 has A13.

The following is a step-by-step instruction on how to solder up two 2764s to fit in a 24 pin socket and be accessed as a 16K chip.

Step 1 — Program the first chip with the data that goes into the lower 8K and mark it as the lower chip. Program the second with the data that goes into the upper 8K and mark that one as the upper chip. It is important not to get the two mixed up, they are not wired up the same way.

Step 2 — Take the lower chip and bend pins #20 and #23. Take the upper chip and bend pins #20 and #27.

Step 3 — Mount the upper chip on top of the lower chip so pin #1 is on pin #1, 2 on 2, and so forth, leaving a small gap for air circulation. Solder all the unbent tips of the upper chip to the bases of the lower chip. Even if the lower pin is bent, in the case of pin #23.

Step 4 — Solder a one-inch piece of #30 wire from pin #20 to pin #22 on the upper IC.

Step 5 — Solder another piece of #30 wire from pin #1 of the lower IC to pin #28, #27 and #26 of the lower IC.

Step 6 — Solder one end of a two-inch piece of #22 wire to pin #2 on the upper IC. Strip ⅛ inch of insulation from the other end. This end will insert into the empty pin #21 of the socket.

Step 7 — Solder one end of a two-inch piece of #22 wire to pin #23 on the upper IC. Strip ⅛ inch of insulation from the other end. This end will insert into the empty pin #18 of the socket.

Step 8 — Solder yet another two-inch piece of #30 wire from pin #20 of the lower IC to pin #27 of the upper IC. Solder one end of another four-inch piece of wire to pin #27 of the upper IC and solder the other end of that to pin #37 of the edge connector. See the first Step 7 for proper location of this pin.

You are now ready to plug the "spider" (as I call it) into the socket. Remember pin #3 in the spider goes into pin #1 of the socket. The other four pins sticking out over the socket are #1, #2, #27 and #28.

By popular request, for those of you who do not want to build this project, there is a board adapter available, built and tested, that you can buy from R.G.S. Micro which does the same thing. See their ad in this magazine. It fits inside only the J&M controller and is made for two Intel 2764 EPROMs.

That is it for now, enjoy your 16K Disk BASIC.

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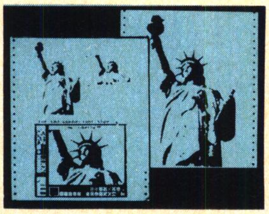

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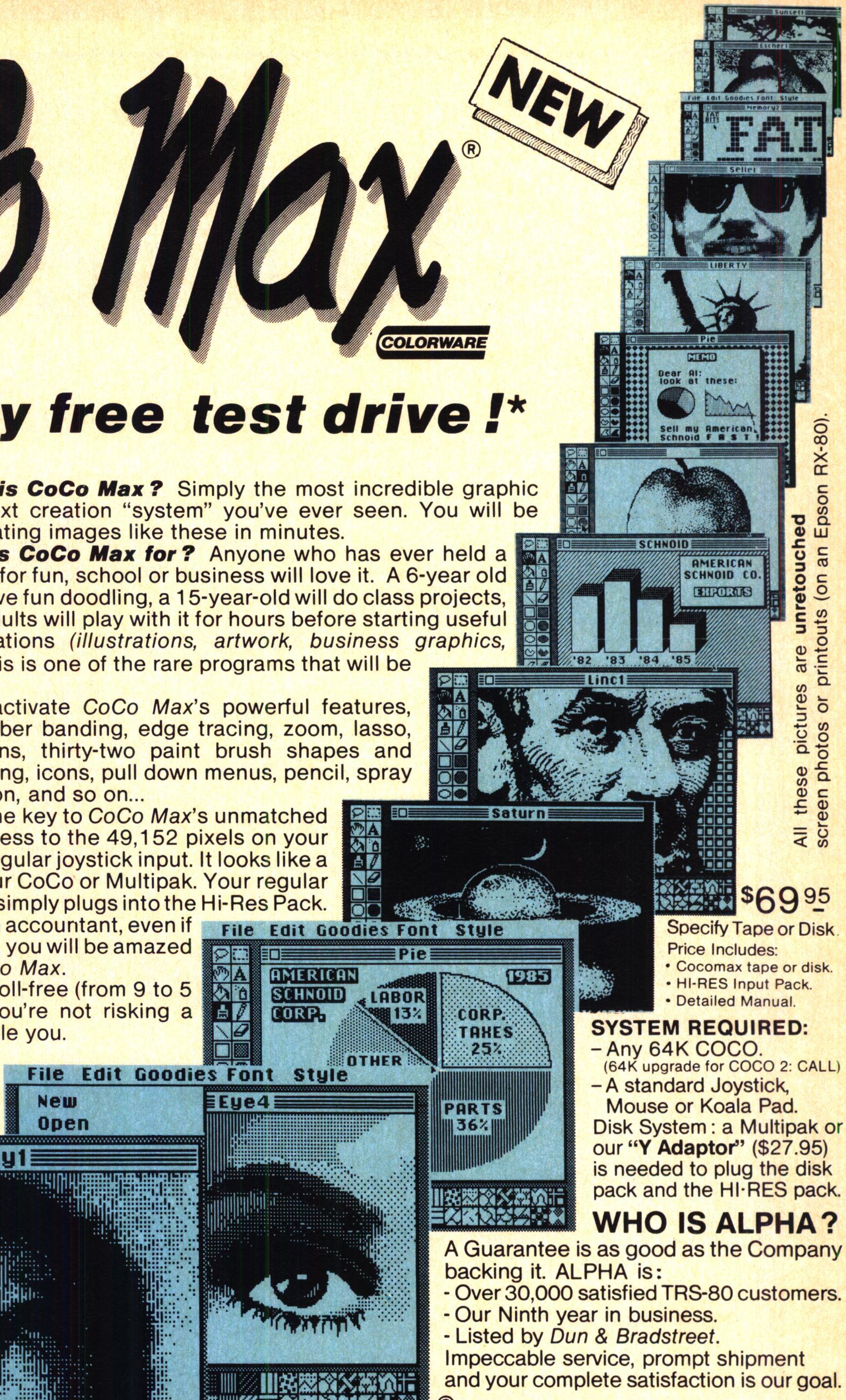
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BUSINESS

Part One of a two-part series

CoCo Becomes

If you own a small business and have any employees, then you know what a hassle payday can be. Now you can put your CoCo to work doing your payroll and allow yourself more time for important matters.

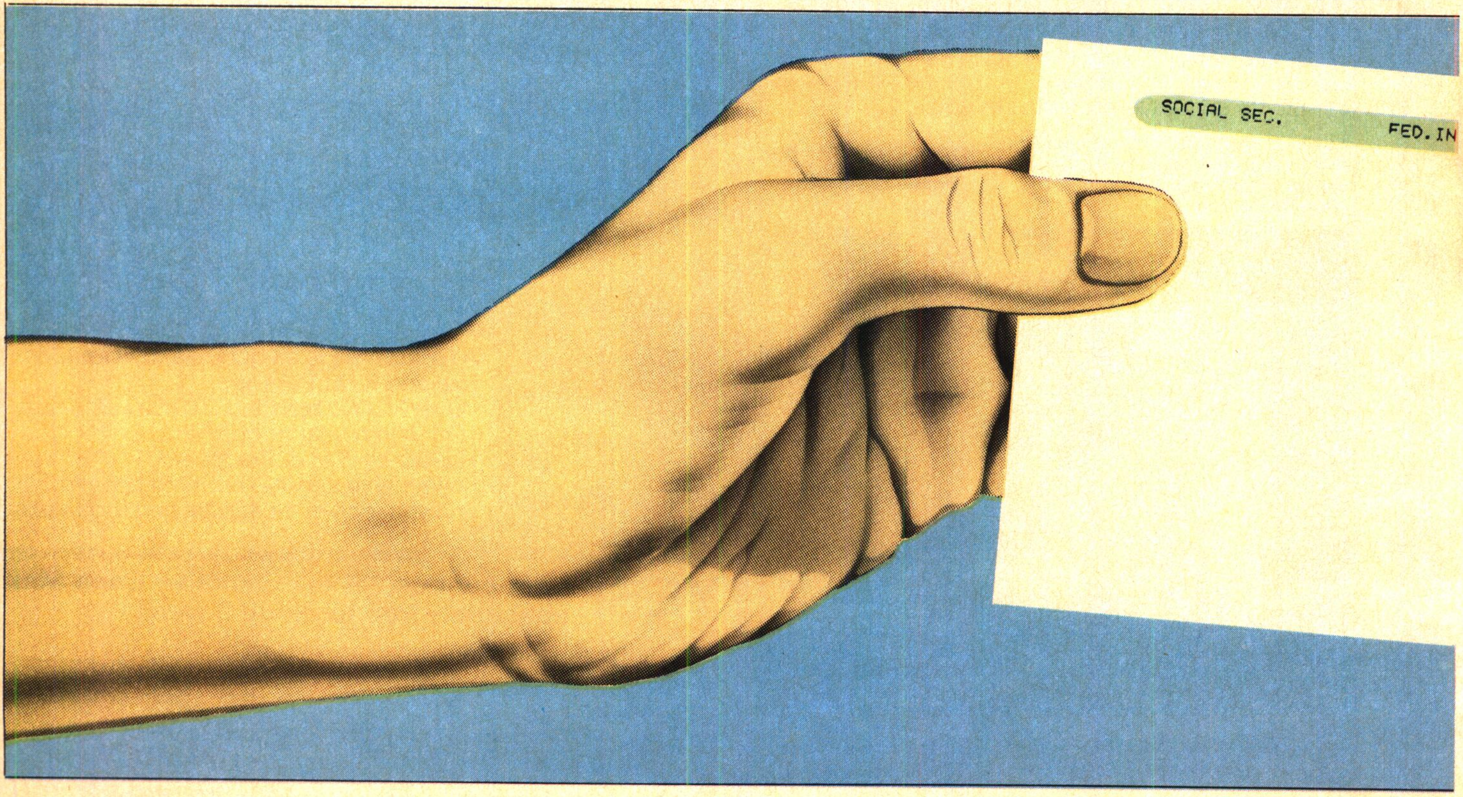
Here's a payroll package that's patterned after one used by a large American corporation. But this one only requires a 16K CoCo, a disk drive and a printer.

Payroll Package is a sophisticated set

(Dennis Weide is a communications technician for AT&T Communications where he is assigned to the electronic switching system. His hobbies include designing and making toys and computers.)

Table 1
Payroll System Program Description
(As listed on Disk Directory)

COMPUTE/BAS	—	Computes payroll for all employees. Calculates net and gross pay. Keeps track of employee attendance. Generates all data for all databases.
EMPLOYEE/BAS	—	Prints pay checks, pay stubs and employee mailing list.
EMPLOYER/BAS	—	Database manager for payroll database. Allows editing of the database.
PAYROLL/DAT	—	Database for all employee data. Used to compute pay and print paychecks.
EMPLOYER/DAT	—	Database for all employer records. Used to compute payroll for employer



16K
Disk

The Paymaster

By Dennis H. Weide

of four programs that should make your business life easier. It shows the usefulness of the CoCo in small business applications. These four programs will compute the payroll, write the paychecks, and keep employee and employer payroll records as well as attendance and vacation records.

It can be modified to analyze or print the stored data in any format desired. You can modify it to print the W-2 forms Uncle Sam requires from everyone. Table 1 gives a brief description of each program and its function.

The programs are straightforward with no fancy gimmicks (PEEKs and POKEs), so they will work on any version of the CoCo with 16K or more and Disk BASIC. The variables are listed along with an explanation at the beginning of each program so any experienced programmer can easily modify them.

How it Works

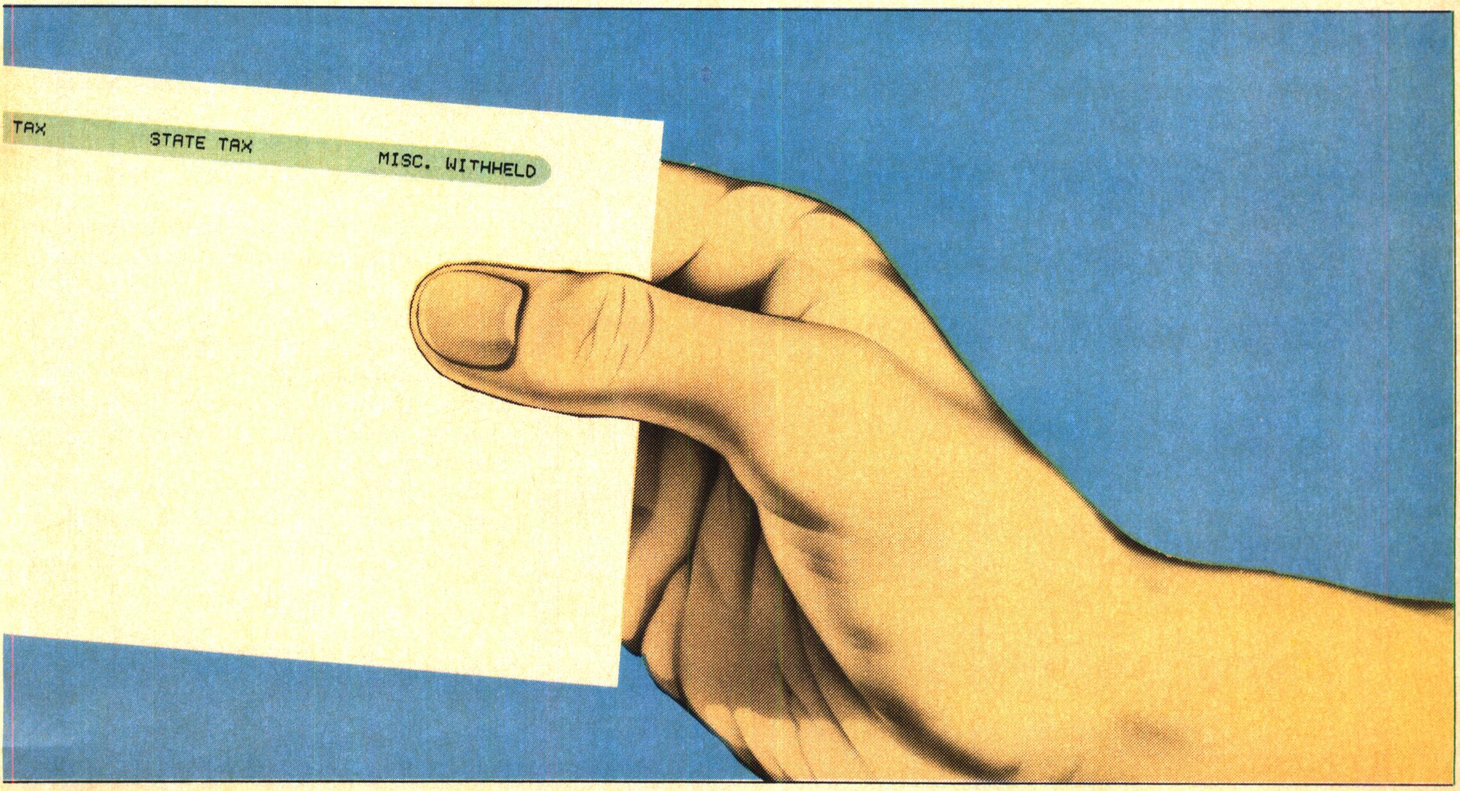
On a normal weekly, bi-weekly or monthly schedule, load and run the payroll program. Enter the payroll codes for each employee, then ask for the paychecks to be printed and sit back and relax or go play a fast round of golf.

A hard copy of the employee's payroll data is provided for the employee and employer to sign and save for reference. After the payroll data has been entered for all employees, you can command the program to print the paychecks and pay stubs.

Setting up the System

This month we'll see how to build and manage the data files used in the package. To get started, key in program listings 1 and 2 one at a time. It's not necessary to key in any lines using REMarks, however, it will make it easier to modify the programs later.

After you have keyed in each program, save it to disk using the program name listed in Line 1,000 of that program. You can save a lot of time if you notice that some subroutines and remarks are common to several programs. Save them to disk using the ASCII option and merge them with each program as needed. Since you'll be reading and writing to disk, it's a good idea to make a backup copy of



the finished programs before running them.

Employee Data File Manager

Now let's take a look at the data files and the programs that manage them. The employee data file consists of a program and file for storing all employee payroll information. Each employee is assigned a record number in the file. A built-in editor allows you to correct errors and retrieve, print, delete or move a file.

Finding a Record Number

To use the editor routine, you must know the employee's record number. This number represents the order the record is stored on disk. To find the record number, enter '6' from the main menu of the *EMPLOYEE* program (LIST RECORDS). The program will read all records on the disk and print each record number and employee name on the screen

Editing an Employee Record

To edit an employee record, enter '4' from the main menu and follow the prompts. To make corrections, enter the new data at the appropriate prompt then press ENTER. If no correction is required for a prompt, press ENTER and the program will jump to the next prompt without changing the data.

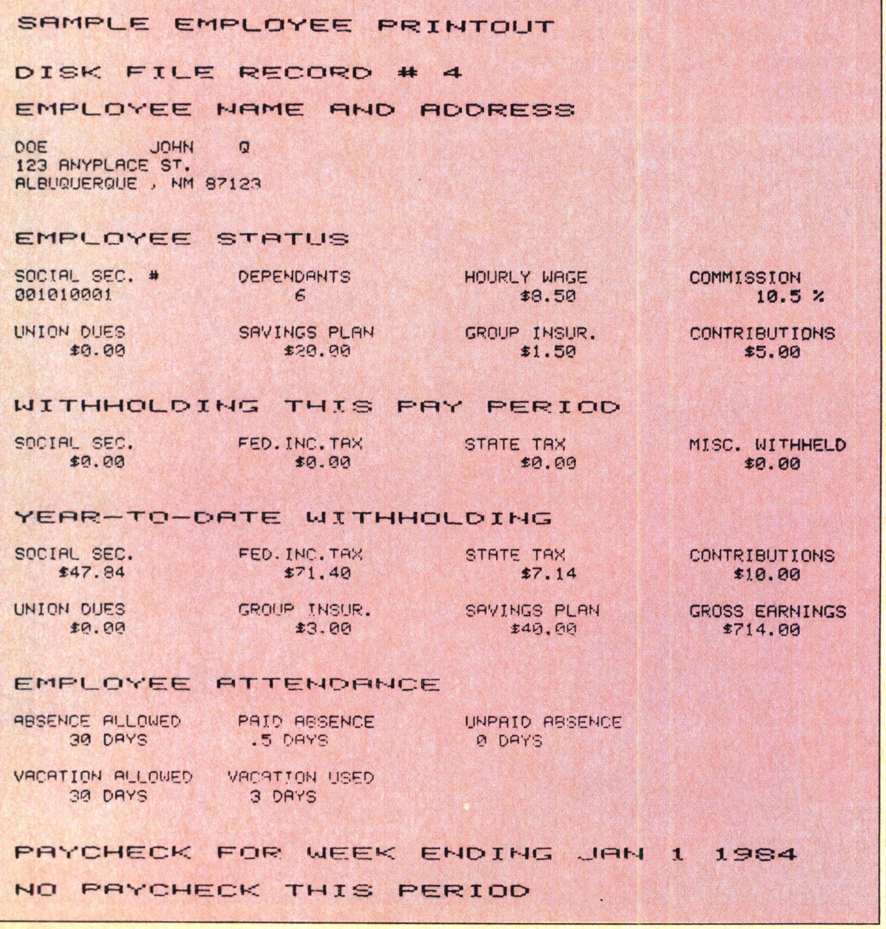
Prompts showing commas require more than one entry. If all data should remain unchanged, press ENTER until the next prompt appears. If one entry of a multiple input entry is changed, you must make an entry for each input. Always verify data when finished by requesting a printout of the edited employee's file.

Printing a Record

To print an employee's record on paper, enter '3' from the main menu. You'll be prompted for the employee's record number. If you enter ALL, the program will print a record for every employee on file. If you enter NONE, the program will return to the main menu.

Entering any number from one to 10 will print the record for that employee. A sample employee printout is included (Figure 1). It is self-explanatory, so when you practice using the package, you shouldn't have any trouble understanding it.

Figure 1



```
SAMPLE EMPLOYEE PRINTOUT

DISK FILE RECORD # 4

EMPLOYEE NAME AND ADDRESS

DOE          JOHN     Q
123 ANYPLACE ST.
ALBUQUERQUE , NM 87123

EMPLOYEE STATUS

SOCIAL SEC. #      DEPENDANTS         HOURLY WAGE        COMMISSION
001010001              6                  $8.50              10.5 %

UNION DUES         SAVINGS PLAN       GROUP INSUR.       CONTRIBUTIONS
    $0.00             $20.00              $1.50              $5.00

WITHHOLDING THIS PAY PERIOD

SOCIAL SEC.        FED.INC.TAX        STATE TAX          MISC. WITHHELD
    $0.00              $0.00              $0.00              $0.00

YEAR-TO-DATE WITHHOLDING

SOCIAL SEC.        FED.INC.TAX        STATE TAX          CONTRIBUTIONS
   $47.84             $71.40              $7.14             $10.00

UNION DUES         GROUP INSUR.       SAVINGS PLAN       GROSS EARNINGS
    $0.00              $3.00             $40.00            $714.00

EMPLOYEE ATTENDANCE

ABSENCE ALLOWED    PAID ABSENCE       UNPAID ABSENCE
    30 DAYS         .5 DAYS            0 DAYS

VACATION ALLOWED   VACATION USED
    30 DAYS          3 DAYS

PAYCHECK FOR WEEK ENDING JAN 1 1984

NO PAYCHECK THIS PERIOD
```

Moving and Deleting a Record

When an employee leaves or retires from the company, you may want to remove that record from disk. Use the edit function of the *EMPLOYEE* program to change the employee's name to NO NAME. The program will now disregard the entire record.

If you wish to overwrite that record, select '5' from the program menu (MOVE EMPLOYEE RECORD). The program will prompt you to verify that the overwrite is correct. The program will only overwrite a NO NAME record. This prevents accidentally overwriting the wrong one and destroying valuable data. If you change a record to NO NAME by mistake, change it back to the correct name by editing it again.

The Employer Data File

The employer data file program stores all the pay period, monthly and year-to-date (y-to-d) totals for the employer's records. It can print, edit or create files much the same as the employee data record program. Prompts and inputs are similar to the employee program so I won't go into much explanation.

You should note that making any changes in the employee data file will most likely require a change in the employer data file, also. Again, a sample employer printout (Figure 2) is shown here and is self-explanatory.

Using the Package

To use these programs, first build the employee and employer data files. Start by typing `RUN ''EMPLOYEE''` and enter. The *EMPLOYEE* program will load from disk and a menu will be displayed on the screen.

Enter '2' to reserve disk space for your employee file. You'll reserve 10 separate records in the employee file, each labeled NO NAME. A warning will appear on the screen telling you you're about to erase all data. This is to prevent accidental erasure of the data file. Since there is no data file yet, enter 'R' to reserve space.

Enter '1' from the main menu to input employee data into the data file. You'll be prompted for the field entries. The

Table 2

	Lines Controlling Number Of Employees		
PROCRAM>	**EMPLOYEE**	**CKWRITER**	**COMPUTE**
	12300	11200	19400
	15800	13000	
	17400		
	32200		

prompts are self-explanatory, but note that any displaying commas must have commas separating the entries as shown. After all entries have been made, you'll be asked if they are correct. Enter 'Y' to save all information to disk. Enter 'N' to erase the entries from RAM and start over.

If you don't wish to create an employee record, you can enter NO NAME for the name prompt and ENTER for all others until you return to the main menu.

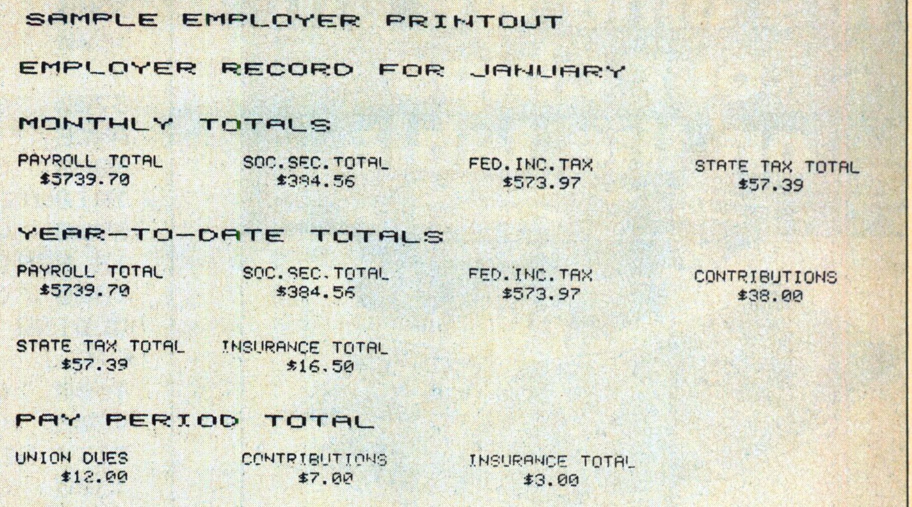
Errors can be corrected using the employee data file editor. After each record is created, you'll be asked if you want to create another. Enter 'Y' for yes or 'N' to return to the main menu.

While this program only handles 10 employees as written, you can increase its capacity to over 500 employees by changing the proper loop values in the programs. Table 2 shows the program names and lines to change to increase or decrease the number of employees.

After building your employee data file, you can get a hard copy of all the data by entering '3' from the main menu and answering the prompt with ALL. All employee data will be output to the printer, allowing you to verify each employee record in the file. Use the editor function to correct any errors.

When your employee data file has been confirmed correct, enter '8' to load and run the *EMPLOYER* program. This program records all pay period and y-to-d information for the employer in the employer data file.

Figure 2



```
SAMPLE EMPLOYER PRINTOUT

EMPLOYER RECORD FOR JANUARY

MONTHLY TOTALS

PAYROLL TOTAL      SOC.SEC.TOTAL      FED.INC.TAX        STATE TAX TOTAL
  $5739.70           $384.56            $573.97             $57.39

YEAR-TO-DATE TOTALS

PAYROLL TOTAL      SOC.SEC.TOTAL      FED.INC.TAX        CONTRIBUTIONS
  $5739.70           $384.56            $573.97             $38.00

STATE TAX TOTAL  INSURANCE TOTAL
   $57.39            $16.50

PAY PERIOD TOTAL

UNION DUES         CONTRIBUTIONS      INSURANCE TOTAL
    $12.00              $7.00              $3.00
```

When the menu is displayed, enter '1' to reserve file space on disk. Again, you will be warned about erasing valuable data, but at this point, there is no employer data, so enter 'R' to create the file on disk. There are no other entries required for the employer data file. The information stored in this file is computed by the *COMPUTE* program.

All employee data is stored in the *EMPLOYEE/DAT* file while employer data is stored in the *EMPLOYER/DAT* file. You can locate these files on disk using the directory `DIR` command. I used direct access files to save as much disk space and time as possible.

Some Final Notes

Next month, we'll take a look at the programs which actually compute the payroll and print the paychecks. In the meantime, it would be a good idea to practice using the two data file managers we have just discussed. Try creating an employee data file and editing and deleting records from it.

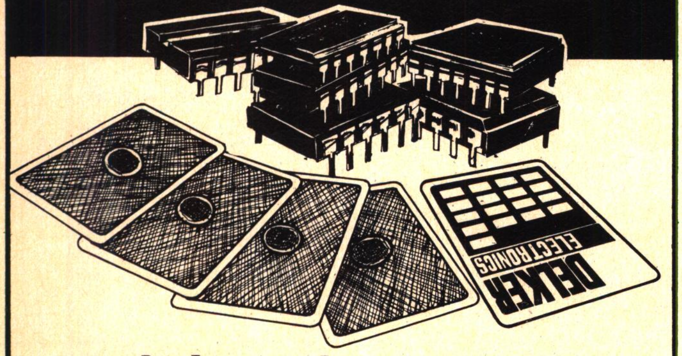
For anyone not wishing to key in the programs, I'll tell you how to get copies next month. If you have any questions or comments, you can write to me at 14201 Marquette N.E., Albuquerque, NM 87123. Please include a SASE. If you have a major program bug, be sure to send along a program listing and sample printouts.

2900	49	20300	232
4800	154	22200	85
6700	91	24100	190
8400	120	25400	57
10000	30	27100	41
12000	213	28400	147
14000	191	30000	199
16700	59	31800	146
18500	91	END	146

Listing 1:
Employee

```
1000 '     EMPLOYEE
1100 '     EMPLOYEE DATA BASE
1200 '     FOR PAYROLL PACKAGE
1300 '     BY DENNIS H. WEIDE
1400 '     (C) 1983
1500 '
1600 CLS:CLEAR1000:F1$="$$#####.
##         ":POKE153,20
1700 '
1800 '     VARIABLE TABLE
1900 '     USE REM STATEMENTS
2000 '
2100 '
2200 '      BUFFER #1-EMPLOYEE VA
RIABLES
2300 '
2400 '(A$)    12   LN$=EMPLOYEE LA
ST NAME
2500 '(B$)     8   GN$=EMPLOYEE GI
VEN NAME
2600 '(C$)     1   MI$=EMPLOYEE MI
DDLE INITIAL
2700 '(D$)    20   AD$=EMPLOYEE ST
REET ADDRESS
2800 '(E$)    12   AC$=EMPLOYEE CI
TY
2900 '(F$)     2   SA$=EMPLOYEE ST
ATE
3000 '(G$)     5   ZC$=EMPLOYEE ZI
P CODE
3100 '(H$)     9   SS$=SOCIAL SECU
RITY NUMBER
3200 '(I$)     1   DN$=NUMBER OF D
EPENDANTS
3300 '(J$)     5   HW =HOURLY WAGE
3400 '(K$)     5   UD =UNION DUES
```

It's time we put our chips on the table



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```
3500 '(L$)      5  CM =COMMISSION
3600 '(M$)      5  SP =SAVINGS PLA
N
3700 '(N$)      5  GI =GROUP INSUR
ANCE
3800 '(O$)      5  CC =CHARITY CON
TRIBUTION
3900 '(P$)      1  PC$=PAYCHECK TH
IS PERIOD (Y/N)
4000 '(Q$)      5  MW =MISC. WITHH
OLDING (SAVINGS,UNION DUES,INS.,
ETC.)
4100 '(R$)      5  TS =TOTAL SALES
4200 '(S$)      5  SW =SOCIAL SECU
RITY WITHHELD
4300 '(T$)      5  FW =FEDERAL INC
OME TAX WITHHELD
4400 '(U$)      5  LW =STATE INCOM
E TAX WITHHELD
4500 '(V$)      5  SY =SOCIAL SECU
RITY Y-TO-D
4600 '(W$)      5  FY =FED. INCOME
 TAX Y-TO-D
4700 '(X$)      5  LY =STATE INCOM
E TAX Y-TO-D
4800 '(Y$)      5  CY =CHARITY Y-T
O-D
4900 '(Z$)      5  UY =UNION DUES
Y-TO-D
5000 '(A1$)     5  GY =GROUP INS.
Y-TO-D
5100 '(A2$)     5  ST =SAVINGS PLA
N TOTAL
5200 '(A3$)     5  PA =TOTAL PAID
ABSENT DAYS
5300 '(A4$)     5  PV =TOTAL PAID
VACATON DAYS USED
5400 '(A5$)     5  UA =TOTAL UNPAI
D ABSENT DAYS
5500 '(A6$)     5  VA =TOTAL VACAT
ION DAYS ALLOWED
5600 '(A7$)     5  AA =PAID ABSENT
 DAYS ALLOWED
5700 '(A8$)     5  RH =REGULAR HOU
RS
5800 '(A9$)     5  OH =OVERTIME HO
URS WORKED
5900 '(B2$)    11  WE$=WEEK ENDING
 STRING
6000 '(B3$)     5  GE =GROSS EARNI
NGS (Y-TO-D)
6100 '       CONTROL CODES
6200 '
6300 LF$=CHR$(10):LP$=CHR$(31):S
P$=CHR$(30):FP$=STRING$(32,"#")
6400 '
```

```
6500 '      PROGRAM MENU
6600 '
6700 CLS:PRINTFP$;:PRINTTAB(3)"E
MPLOYEE DATA BASE PROGRAM":PRINT
FP$;
6800 PRINTTAB(10)"PROGRAM MENU"
6900 PRINTTAB(2)"1. CREATE NEW E
MPLOYEE FILE"
7000 PRINTTAB(2)"2. RESERVE DISK
 FILE SPACE"
7100 PRINTTAB(2)"3. EMPLOYEE PRI
NTOUT"
7200 PRINTTAB(2)"4. EDIT EMPLOYE
E FILE"
7300 PRINTTAB(2)"5. MOVE EMPLOYE
E FILE"
7400 PRINTTAB(2)"6. LIST RECORDS
"
7500 PRINTTAB(2)"7. PRINT CHECKS
"
7600 PRINTTAB(2)"8. EMPLOYER DAT
A BASE"
7700 PRINTTAB(2)"9. COMPUTE PAYR
OLL"
7800 PRINTTAB(1)"10. END PROGRAM
"
7900 PRINT:INPUT"     ENTER ONE
OF THE ABOVE";Y
8000 ON Y GOTO12200,15500,16700,
22200,31000,32200,32700,32600,32
800,8200
8100 GOSUB33200:GOTO6700
8200 END
8300 '
8400 '      SUBROUTINE TO OPEN FI
LE
8500 '
8600 OPEN"D",#1,"PAYROLL",212
8700 FIELD#1,12ASA$,8ASB$,1AS C$
,20ASD$,12ASE$,2ASF$,5ASG$,9ASH$
,1ASI$,5ASJ$,5ASK$,5ASL$,5ASM$,5
ASN$,5ASO$,1ASP$,5ASQ$,5ASR$,5AS
S$,5AST$,5ASU$,5ASV$,5ASW$,5ASX$
,5ASY$,5ASZ$,5ASA1$,5ASA2$,5ASA3
$,5ASA4$,5ASA5$,5ASA6$,5ASA7$,5A
SA8$,5ASA9$,11ASB2$,5ASB3$
8800 RETURN
8900 '
9000 '      LSET EMPLOYEE VARIABL
ES
9100 '
9200 LSETA$=LN$:LSETB$=GN$:LSETC
$=MI$
9300 LSETD$=AD$:LSETE$=AC$:LSETF
$=SA$
9400 LSETG$=ZC$:LSETH$=SS$:LSETI
$=DN$
9500 LSETJ$=MKN$(HW):LSETK$=MKN$
```

SUPPORT:

(sə·pôrt) v.t. **1**. To bear the weight of, especially from underneath; uphold in position; keep from failing, etc. **2**. To bear or sustain (weight; etc.) **3**. To keep from failing; strengthen: *PBJ, Inc. supports their product line with technical personnel that are always there to help you.* **4**. To serve, to uphold or corroborate (a statement, theory, etc.) substantiate; verify: *PBJ, Inc. receives testimonials on a daily basis that support their product line.* **5**. To provide (a person, institution) with maintenance; provide for: *PBJ, Inc. supports the CoCo user by consistently creating new advancements in their field.*

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A long description indeed, yet very applicable to the kind of service delivered by PBJ, Inc. When the serious CoCo user needs back-up support, technical information or assistance, PBJ, Inc. is there! From the products they manufacture through to the strategic solutions they offer, PBJ, Inc. has rightfully gained the reputation of "the company with *the most support* for the Color Computer."

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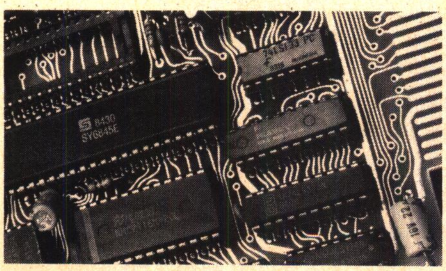
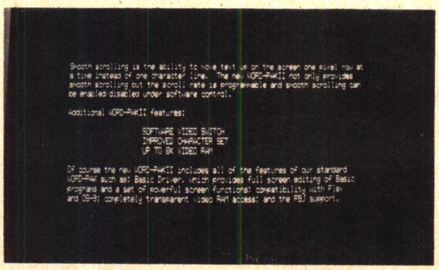
*Derived from *Funk & Wagnall's International Dictionary*



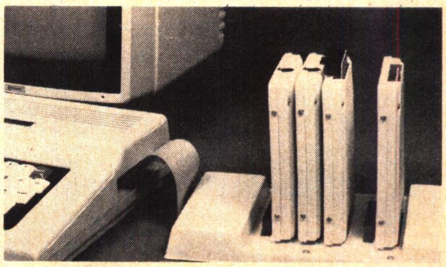


Smooth scrolling is the ability to move text up on the screen one pixel row at a time instead of one character line. The new WORD-PAKII not only provides smooth scrolling but the scroll rate is programmable and smooth scrolling can be enabled/disabled under software control.

Additional WORD-PAKII features:

SOFTWARE VIDEO SWITCH
IMPROVED CHARACTER SET
UP TO 8K VIDEO RAM

Of course the new WORD-PAKII includes all of the features of our standard WORD-PAK such as: Basic Driver, which provides full screen editing of Basic programs and a set of powerful screen functions; compatibility with Flex and OS-9; completely transparent video RAM access; and the PBJ support.



```
(UD):LSETL$=MKN$(CM)
9600 LSETM$=MKN$(SP):LSETN$=MKN$
(GI):LSETO$=MKN$(CC)
9700 LSETS$=MKN$(SW):LSETT$=MKN$
(FW):LSETU$=MKN$(LW)
9800 LSETV$=MKN$(SY):LSETW$=MKN$
(FY):LSETX$=MKN$(LY)
9900 LSETY$=MKN$(CY):LSETZ$=MKN$
(UY):LSETR$=MKN$(TS)
10000 LSETA1$=MKN$(GY):LSETA2$=M
KN$(ST):LSETP$=PC$
10100 LSETA3$=MKN$(PA):LSETA4$=M
KN$(PV):LSETA5$=MKN$(UA)
10200 LSETA6$=MKN$(VA):LSETA7$=M
KN$(AA):LSETA8$=MKN$(RH)
10300 LSETA9$=MKN$(OH):LSETB2$=W
E$:LSETQ$=MKN$(MW)
10400 LSETB3$=MKN$(GE)
10500 RETURN
10600 '
10700 '      CONVERT 5 BYTE CODED
 STRING
10800 '
10900 HW=CVN(J$):UD=CVN(K$):CM=C
VN(L$)
11000 SP=CVN(M$):GI=CVN(N$):CC=C
VN(O$)
11100 SW=CVN(S$):FW=CVN(T$):LW=C
VN(U$)
11200 SY=CVN(V$):FY=CVN(W$):LY=C
VN(X$)
11300 CY=CVN(Y$):UY=CVN(Z$):RH=C
VN(A8$)
11400 GY=CVN(A1$):ST=CVN(A2$):OH
=CVN(A9$)
11500 PA=CVN(A3$):PV=CVN(A4$):UA
=CVN(A5$)
11600 VA=CVN(A6$):AA=CVN(A7$):TS
=CVN(R$)
11700 MW=CVN(Q$):WE$=B2$:PC$=P$:
GE=CVN(B3$)
11800 RETURN
11900 '
12000 '      CREATE A NEW FILE
12100 '
12200 CLS:GOSUB8600
12300 FORX=1TO10:GET#1,X
12400 IFLEFT$(A$,7)="NO NAME"THE
N12700ELSENEXTX
12500 CLS:PRINT:PRINT"NO SPARE R
ECORDS LEFT. YOU MUST RESERVE MO
RE RECORDS."
12600 PRINT:INPUT"      PRESS <EN
TER> TO CONTINUE";Y:GOTO6700
12700 CLOSE#1:CLS:PRINTSTRING$(3
2,"#");:PRINTTAB(3)"ENTER EMPLOY
EE INFORMATION":PRINTSTRING$(32,
"#");
12800 PRINT"NAME (LAST,FIRST,INI
TIAL)":PC$="N"
12900 INPUTLN$,GN$,MI$
13000 IFLN$="NO NAME"THEN14500
13100 PRINT"STREET ADDRESS"
13200 INPUTAD$
13300 PRINT"CITY(12),STATE(2),ZI
P CODE(5)"
13400 INPUTAC$,SA$,ZC$
13500 INPUT"SOCIAL SECURITY #";S
S$
13600 INPUT"NUMBER OF DEPENDANTS
";DN$
13700 INPUT"HOURLY PAY RATE";HW
13800 INPUT"UNION DUES RATE";UD
13900 INPUT"COMMISSION RATE";CM
14000 INPUT"SAVINGS PLAN AMOUNT"
;SP
14100 INPUT"GROUP INSURANCE AMOU
NT";GI
14200 INPUT"CHARITY AMOUNT";CC
14300 INPUT"ABSENCE DAYS ALLOWED
";AA
14400 INPUT"VACATION DAYS ALLOWE
D";VA
14500 INPUT"IS ALL INFORMATION C
ORRECT";X1$
14600 IFLEFT$(X1$,1)="Y"THEN1470
0ELSE12700
14700 GOSUB8600:GOSUB9200
14800 PUT#1,X
14900 CLOSE#1
15000 INPUT"ANOTHER NEW FILE";X1
$
15100 IFX1$="Y"THEN12200ELSE6700
15200 '
15300 '      RESERVE FILE ROOM
15400 '
15500 GOSUB34000
15600 IFE2$="R"THEN15700ELSE6700
15700 LN$="NO NAME":GOSUB8600
15800 FORX=1TO10
15900 GOSUB9200
16000 PUT#1,X
16100 NEXTX
16200 CLOSE#1
16300 GOTO6700
16400 '
16500 '      READ DATA FILE
16600 '
16700 CLS:OA=0:PRINTFP$;:PRINTTA
B(10)"DATA READOUT":PRINTFP$;
16800 PRINT:INPUT"ENTER EMPLOYEE
 RECORD #";ER$
16900 IFER$="ALL"THEN17300ELSEIF
ER$="NONE"THEN6700
17000 X=VAL(ER$):OA=1: IF X<1ORX>
10THENGOSUB33200:GOTO16700
17100 GOSUB8600:GOTO17500
17200 CLS:PRINTFP$;:PRINTTAB(9)"
```

CALINDEX
The automated computer calendar

Memo **Code: A0**

Get Food For ST. PATRICKS PARTY 3/17/85

DUE DATE: MARCH 12,1985

ANNOUNCING

CALINDEX I

uses a single disk for all calendar entries. It is an excellant, low cost calendar for family or personnal use. Keep track of your appointments, and important dates such as birthdays, anniversarys, etc. with this perpetual calendar.

Each member of your family can have a separate calendar on the same disk, and all calendars can be scanned quickly and efficiently. A simplified chain of command feature allows entries not taken care of to be shown on the overdue file at the top of the supervisory ladder.

CALINDEX II

utilizes separate disks for calendar memo files and the database list function. CALINDEX II was designed for business, club and professional uses where it is necessary to supervise a number of people or projects. Detailed flow charts can be created and keyed into the calendar to supervise complex projects.

A sophisticated chain of command feature automatically bumps up the supervisory ladder entries not taken care of by the appropriate due date at lower levels. Four levels of authority and the potential for operating fifteen individual calendars provide a management at workhorse low cost.

FEATURES

- Easy to write file cards
- Chain of command supervisor
- Automatic tickler file
- Multiple calendar management
- Perpetual calendar entries
- List creation feature
- Archive for satisified entries
- Automatic scan selection
- Uses standard printer

BOTH CALINDEX I & II

are user friendly programs. They feature the ability to create and supervise up to fifteen individual calendars. The calendars can be used by individuals or can be different projects that you wish to supervise.

The CALINDEX features as listed to the right provide a power packed program that will make you and those who use the program more efficient. This translates into more leasure time, more money and more enjoyment out of life. Try it! If you are not satisfied we will happily refund your money.

PLEASE SEND THIS PROGRAM!

Check One

	PRICE
☐ **CALINDEX I:** Single Disk Personal/Family Calendar	$39.00
☐ **CALINDEX II:** 3 Disk Calendar For Professional/Social Club/Business Applications....	$55.00

NOTE: Both calendars require minimun 32K + 1 Disk Drive

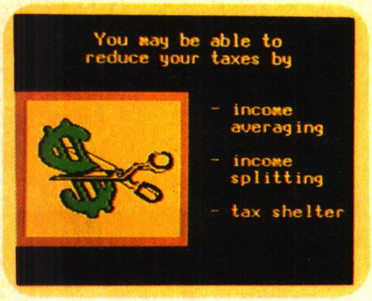
Please Send To:
NAME ____________________
ADDRESS ____________________
CITY ____________ *STATE* ____________ ZIP ____________
☐ My check for ____________ is enclosed (Calif. residents add 6.5% sales tax)

```
READ DATA FILE":PRINTFP$;
17300 GOSUB8600
17400 FORX=1TO10
17500 GET#1,X:GOSUB10900
17600 PRINT#-2,LP$;"DISK FILE RE
CORD #";X;SP$
17700 IFLEFT$(A$,7)="NO NAME"THE
NPRINT#-2,A$:GOTO21700
17800 PRINT#-2,LF$;LP$;"EMPLOYEE
 NAME AND ADDRESS";SP$;LF$
17900 PRINT#-2,A$;B$;C$
18000 PRINT#-2,D$
18100 PRINT#-2,E$",  "F$" "G$
18200 PRINT#-2,LF$
18300 PRINT#-2,LP$;"EMPLOYEE STA
TUS";SP$;LF$
18400 PRINT#-2,"SOCIAL SEC. #","
DEPENDANTS","HOURLY WAGE","COMMI
SSION"
18500 PRINT#-2,H$;TAB(25)I$;TAB(
42)"";:PRINT#-2,USING"$$###.##";
HW;:PRINT#-2,TAB(65)CM*100;"%"
18600 PRINT#-2
18700 PRINT#-2,"UNION DUES","SAV
INGS PLAN","GROUP INSUR.","CONTR
IBUTIONS"
18800 PRINT#-2,USINGF1$;UD;SP;GI
;CC
18900 PRINT#-2,LP$;LF$;LF$;"WITH
HOLDING THIS PAY PERIOD";LF$;SP$
19000 PRINT#-2,"SOCIAL SEC.","FE
D.INC.TAX","STATE TAX","MISC. WI
THHELD"
19100 MW=SP+CC+GI+UD:IFPC$="N"TH
ENMW=0
19200 PRINT#-2,USINGF1$;SW;FW;LW
;MW
19300 PRINT#-2
19400 PRINT#-2,LP$;LF$;"YEAR-TO-
DATE WITHHOLDING";LF$;SP$
19500 PRINT#-2,"SOCIAL SEC.","FE
D.INC.TAX","STATE TAX","CONTRIBU
TIONS"
19600 PRINT#-2,USINGF1$;SY;FY;LY
;CY
19700 PRINT#-2
19800 PRINT#-2,"UNION DUES","GRO
UP INSUR.","SAVINGS PLAN","GROSS
 EARNINGS"
19900 PRINT#-2,USINGF1$;UY;GY;ST
;GE
20000 PRINT#-2,LF$;LF$;LP$;"EMPL
OYEE ATTENDANCE";LF$;SP$
20100 PRINT#-2,"ABSENCE ALLOWED"
,"PAID ABSENCE","UNPAID ABSENCE"
20200 PRINT#-2,TAB(4)AA"DAYS",PA
```

NEW! For IBM PC Jr.

Also Available for Apple • TRS 80 I, III, 4 & Color • Atari • Commodore

Over 1000 Full Time Audio Interactive Tutorial Programs!



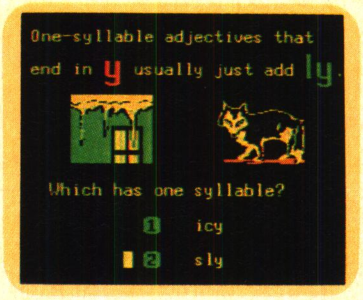
You may be able to reduce your taxes by

- income averaging
- income splitting
- tax shelter

Which?

1 sister

2 smaller



One-syllable adjectives that end in y usually just add ly.

Which has one syllable?

1 icy

2 sly

We're Your Educational Software Source for Grades K-12 and Advanced Studies

Course	No. of Programs
Reading	256
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16 Programs in each of the following:

Children's Tales - Carpentry - Electronics -Health Services - Office Skills - Statistics -First Aid/Safety - Economics - Business - Accounting - Psychology - AND MANY MORE!

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```
"DAYS",UA"DAYS"
20300 PRINT#-2,LF$;"VACATION ALL
OWED","VACATION USED"
20400 PRINT#-2,TAB(4)VA"DAYS",PV
"DAYS"
20500 PRINT#-2,LP$;LF$;LF$;"PAYC
HECK FOR WEEK ENDING ";WE$;LF$;S
P$
20600 IFPC$="N"THENPRINT#-2,LP$;
"NO PAYCHECK THIS PERIOD";SP$:PR
INT#-2,STRING$(20,10):GOTO21700
20700 PRINT#-2,"REGULAR HOURS","
OVERTIME HOURS"
20800 GA=(RH+(OH*1.5))*HW+(TS*CM
)
20900 TW=MW+FW+SW+LW
21000 PT=GA-TW
21100 PRINT#-2,TAB(6)RH;TAB(25)O
H
21200 PRINT#-2
21300 PRINT#-2,"TOTAL SALES","GR
OSS AMOUNT","TOTAL WITHHELD","NE
T AMOUNT"
21400 PRINT#-2,USINGF1$;TS;GA;TW
;PT
21500 PRINT#-2,STRING$(16,10)
21600 IFOA=1THENCLOSE#1:GOTO6700
21700 IFOA=1THENCLOSE#1:GOTO6700
:ELSENEXT X:CLOSE#1
21800 GOTO6700
21900 '
22000 '      EDIT EMPLOYEE FILE
22100 '
22200 CLS:PRINTFP$;:PRINTTAB(7)"
EDIT EMPLOYEE FILE":PRINTFP$;
22300 PRINT:INPUT"ENTER EMPLOYEE
 RECORD #";X
22400 IFX<1THEN6700
22500 GOSUB8600:GET#1,X:GOSUB109
00
22600 CLS:PRINTFP$;:PRINTTAB(7)"
EDIT EMPLOYEE FILE":PRINTFP$
22700 PRINT@130,"1.EMPLOYEE NAME
 AND ADDRESS"
22800 PRINTTAB(2)"2.EMPLOYEE PAY
 STATUS"
22900 PRINTTAB(2)"3.WITHHOLDING
THIS PAY PERIOD"
23000 PRINTTAB(2)"4.WITHHOLDING
YEAR-TO-DATE"
23100 PRINTTAB(2)"5.EMPLOYEE ATT
ENDANCE RECORDS"
23200 PRINTTAB(2)"6.PAYROLL COMP
UTATION"
23300 PRINTTAB(2)"7.END EDIT FUN
CTION"
23400 PRINT:INPUT"     ENTER ONE
OF THE ABOVE";OA
23500 CLS:ON OA GOTO24000,25100,
26600,27500,28500,29800,30600
23600 GOSUB33200:GOTO22200
23700 '
23800 '      EDIT EMPLOYEE NAME &
 ADDRESS
23900 '
24000 PRINTFP$;:PRINTTAB(2)"EDIT
 EMPLOYEE NAME & ADDRESS":PRINTF
P$
24100 PRINT:PRINT"ENTER EMPLOYEE
 NAME":PRINT" (LAST,FIRST,INITIA
L)"
24200 INPUTLN$,GN$,MI$:IFLN$=""T
HEN24300ELSELSETA$=LN$:LSETB$=GN
$:LSETC$=MI$
24300 PRINT:PRINT"ENTER EMPLOYEE
 STREET ADDRESS"
24400 INPUTAD$:IFAD$=""THEN24500
ELSELSETD$=AD$
24500 PRINT:PRINT"ENTER CITY (12
),ST (2),ZIP (5)"
24600 INPUTAC$,SA$,ZC$:IFAC$=""T
HEN24700ELSELSETE$=AC$:LSETF$=SA
$:LSETG$=ZC$
24700 GOTO22600
24800 '
24900 '      EDIT EMPLOYEE PAY ST
ATUS
25000 '
25100 PRINTFP$;:PRINTTAB(6)"EDIT
 EMPLOYEE PAY STATUS":PRINTFP$
25200 PRINT:PRINT"ENTER SOCIAL S
ECURITY NUMBER":INPUTSS$
25300 IFSS$=""THEN25400ELSELSETH
$=SS$
25400 PRINT"ENTER NUMBER OF DEPE
NDANTS":INPUTDN$
25500 IFDN$=""THEN25600ELSELSETI
$=DN$
25600 PRINT"ENTER HOURLY WAGE":I
NPUTB1$:IFB1$=""THEN25700ELSELSE
TJ$=MKN$(VAL(B1$))
```

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Password protected encryption program hides information. Requires 16K extended basic.
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```
25700 PRINT"ENTER UNION DUES":IN
PUTB1$:IFB1$=""THEN25800ELSELSET
K$=MKN$(VAL(B1$))
25800 PRINT"ENTER COMMISSION PER
CENT":INPUTB1$:IFB1$=""THEN25900
ELSELSETL$=MKN$(VAL(B1$)/100)
25900 PRINT"ENTER SAVINGS DEDUCT
ION":INPUTB1$:IFB1$=""THEN26000E
LSELSETM$=MKN$(VAL(B1$))
26000 PRINT"ENTER GROUP INSURANC
E":INPUTB1$:IFB1$=""THEN26100ELS
ELSETN$=MKN$(VAL(B1$))
26100 PRINT"ENTER CHARITY DEDUCT
ION":INPUTB1$:IFB1$=""THEN26200E
LSELSETO$=MKN$(VAL(B1$))
26200 GOTO22600
26300 '
26400 '      EDIT WITHHOLDING THI
S PAY PERIOD
26500 '
26600 PRINTFP$;:PRINT"EDIT WITHH
OLDING THIS PAY PERIOD";FP$
26700 PRINT"EDIT SOC. SEC. WITHH
ELD":INPUTB1$:IFB1$=""THEN26800E
LSELSETS$=MKN$(VAL(B1$))
26800 PRINT"EDIT FICA WITHHELD":
INPUTB1$:IFB1$=""THEN26900ELSELS
ETT$=MKN$(VAL(B1$))
26900 PRINT"EDIT STATE TAX WITHH
ELD":INPUTB1$:IFB1$=""THEN27000E
LSELSETU$=MKN$(VAL(B1$))
27000 PRINT"EDIT MISC. WITHHOLDI
NG":INPUTB1$:IFB1$=""THEN27100EL
SELSETQ$=MKN$(VAL(B1$))
27100 GOTO22600
27200 '
27300 '      EDIT YEAR-TO-DATE WI
THHOLDING
27400 '
27500 PRINTFP$;:PRINT" EDIT YEAR
-TO-DATE WITHHOLDING":PRINTFP$
27600 PRINT"ENTER SOC. SEC. TOTA
L":INPUTB1$:IFB1$=""THEN27700ELS
ELSETV$=MKN$(VAL(B1$))
27700 PRINT"ENTER FICA TOTAL":IN
PUTB1$:IFB1$=""THEN27800ELSELSET
W$=MKN$(VAL(B1$))
27800 PRINT"ENTER STATE TAX TOTA
L":INPUTB1$:IFB1$=""THEN27900ELS
ELSETX$=MKN$(VAL(B1$))
27900 PRINT"ENTER CONTRIBUTIONS
TOTAL":INPUTB1$:IFB1$=""THEN2800
0ELSELSETY$=MKN$(VAL(B1$))
28000 PRINT"ENTER UNION DUES TOT
AL":INPUTB1$:IFB1$=""THEN28100EL
SELSETZ$=MKN$(VAL(B1$))
28100 PRINT"ENTER GROUP INS. TOT
AL":INPUTB1$:IFB1$=""THEN28200EL
SELSETA1$=MKN$(VAL(B1$))
28200 PRINT"ENTER SAVINGS TOTAL"
:INPUTB1$:IFB1$=""THEN28300ELSEL
SETA2$=MKN$(VAL(B1$))
28300 PRINT"ENTER GROSS EARNINGS
":INPUTB1$:IFB1$=""THEN28400ELSE
LSETB3$=MKN$(VAL(B1$))
28400 GOTO22600
28500 '
28600 '      EDIT EMPLOYEE ATTEND
ANCE RECORD"
28700 '
28800 PRINTFP$;:PRINTTAB(4)"EDIT
 EMPLOYEE ATTENDANCE":PRINTFP$
28900 PRINT"EDIT ABSENCE DAYS AL
LOWED":INPUTB1$:IFB1$=""THEN2900
0ELSELSETA7$=MKN$(VAL(B1$))
29000 PRINT"EDIT PAID ABSENCE":I
NPUTB1$:IFB1$=""THEN29100ELSELSE
TA3$=MKN$(VAL(B1$))
29100 PRINT"EDIT VACATION ALLOWE
D":INPUTB1$:IFB1$=""THEN29200ELS
ELSETA6$=MKN$(VAL(B1$))
29200 PRINT"EDIT VACATION USED":
INPUTB1$:IFB1$=""THEN29300ELSELS
ETA4$=MKN$(VAL(B1$))
29300 PRINT"EDIT UNPAID ABSENCE"
:INPUTB1$:IFB1$=""THEN29400ELSEL
SETA5$=MKN$(VAL(B1$))
29400 GOTO22600
29500 '
29600 '      EDIT PAYROLL COMPUTA
TION
29700 '
29800 PRINTFP$;:PRINTTAB(4)"EDIT
 PAYROLL COMPUTATION":PRINTFP$
29900 PRINT"REGULAR HOURS":INPUT
B1$:IFB1$=""THEN30000ELSELSETA8$
=MKN$(VAL(B1$))
30000 PRINT"OVERTIME HOURS":INPU
TB1$:IFB1$=""THEN30100ELSELSETA9
$=MKN$(VAL(B1$))
30100 PRINT"TOTAL SALES":INPUTB1
$:IFB1$=""THEN30200ELSELSETR$=MK
N$(VAL(B1$))
30200 GOTO22600
30300 '
30400 '      END EDIT FUNCTION
30500 '
30600 PUT#1,X:CLOSE#1:GOTO6700
30700 '
30800 '      MOVE EMPLOYEE FILE
30900 '
31000 CLS:PRINTFP$;:PRINTTAB(6)"
MOVE EMPLOYEE RECORD":PRINTFP$
31100 GOSUB8600:PRINT:INPUT"ENTE
R OLD EMPLOYEE RECORD #";PR$
31200 IFPR$="NONE"THEN6700ELSEPR
=VAL(PR$)
31300 GET#1,PR:PRINT"RECORD #"PR
```

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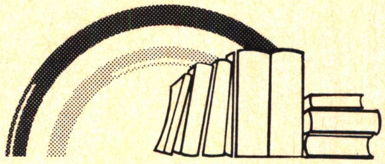

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```
31400 PRINTA$;B$;C$:INPUT"IS THI
S INFORMATION CORRECT (Y/N)";OA$
31500 IFOA$="Y"THEN31600ELSE3100
0
31600 PRINT:INPUT"ENTER NEW RECO
RD #";NR
31700 GET#1,NR:IFLEFT$(A$,7)<>"N
O NAME"THENGOSUB33200:CLOSE#1:EL
SEGOTO31000
31800 GET#1,PR:PUT#1,NR:CLOSE#1:
GOTO6700
31900 '
32000 '      LIST RECORDS
32100 '
32200 CLS:PRINTFP$;:PRINTTAB(10)
"RECORDS LIST":PRINTFP$:GOSUB860
0:FORX=1TO10:GET#1,X
32300 PRINT"REC#"X;TAB(8)A$;B$;C
$
32400 NEXTX:CLOSE#1:INPUT"    PRE
SS <ENTER> TO CONTINUE";OA
32500 GOTO6700
32600 CLS:PRINTFP$;:PRINTTAB(8)"
ONE MOMENT PLEASE":PRINTFP$:RUN"
EMPLOYER"
32700 CLS:PRINTFP$;:PRINTTAB(8)"
ONE MOMENT PLEASE":PRINTFP$:RUN"
CKWRITER"
32800 CLS:PRINTFP$;:PRINTTAB(8)"
ONE MOMENT PLEASE":PRINTFP$:RUN"
COMPUTE"
32900 '
33000 '      ERROR ROUTINE
33100 '
33200 FOR X=1 TO 10:CLS
33300 FOR T=1 TO 50:NEXT T
33400 PRINT@233,"ILLEGAL ENTRY":
SOUND 100,1
33500 FOR Y=1 TO 50:NEXT Y,X:CLS
:RETURN
33600 RETURN
33700 '
33800 '      WARNING ROUTINE
33900 '
34000 CLS:PRINTFP$;:PRINTTAB(12)
"warning":PRINT:PRINT" RESERVING
 DISK FILE SPACE WILL    DESTROY
 ANY PAYROLL RECORDS         CUR
RENTLY ON DISK!!":PRINT:PRINTFP$
34100 FORX=1TO20:SOUND100,1:FORY
=1TO20:NEXTY,X
34200 PRINT:PRINT"PRESS <ENTER>
TO RETURN TO MENU"
34300 PRINT"PRESS r TO RESERVE S
PACE"
34400 E2$=INKEY$:IFE2$=""THEN344
00ELSERETURN
```

One-Liner Contest Winner . . .

One of these days when you run out of things to do with your printer, you can use this one-liner to print diskette jackets. The program should work with any ordinary printer. After printing, cut along the dotted line, fold the two halves together and fold and tape the tabs.

The listing:

```
1 FORI=1TO71:PRINT#-2,".";:NEXT:
PRINT#-2," ":FORI=1TO22:PRINT#-2
,".";TAB(7);".";TAB(63);".";TAB(
70);".":NEXT:FORI=1TO71:PRINT#-2
,".";:NEXT:PRINT#-2," ":FORI=1TO
28:PRINT#-2,TAB(7);".";TAB(63);"
.":NEXT:PRINT#-2,TAB(7);:FORI=7T
O63:PRINT#-2,".";:NEXT:END
```

George Yeager
Saint Albans, WV

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape.*)

One-Liner Contest Winner . . .

This is a skiing game using the right joystick. Move your skis left or right as you go down the mountain. Try to pass between the flags. The game ends when you knock down 10 flags.

The listing:

```
1 S=RND(15):PRINT@S+487,"^ ^";:F
ORX=1TO9:Z=INT(JOYSTK(0)/22)-1:R
=R+Z:PRINT@507,G"yyyy"P;:PRINT@2
00+R,"#";:PLAY"T15A":NEXT:IFR=S
THENPLAY"B":P=P+5:GOTO1ELSEP=P-1
:IFR+1=S ORR-1=S THENPLAY"FD":PR
INT@199+R,"_";:G=G+1:IFG=10THENP
RINTG ELSE1ELSE1
```

Kevin Derby
Lubbock, TX

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape.*)

2700	70	13000	177
4700	101	14700	150
6700	214	16400	43
8900	171	END	246
10700	107		

Listing 2:
Employer

```
1000 '      EMPLOYER
1100 '      EMPLOYER DATA BASE PR
OGRAM
1200 '      FOR PAYROLL PACKAGE
1300 '      BY DENNIS H. WEIDE
1400 '      COPYRIGHT 1983
1500 '
1600 CLS:CLEAR1000:POKE153,20:F1
$="$$#####.##          ":DIMMN$(
12):GOTO3900
1700 '
1800 '
1900 '
2000 '      BUFFER #2-EMPLOYER VA
RIABLES
2100 '
2200 '(D1$)    9  MO$=PAYROLL MO
NTH
2300 '(D2$)    5  PT =EMPLOYER P
AYROLL TOTAL
2400 '(D3$)    5  PY =EMPLOYER P
AYROLL Y-TO-D
2500 '(D4$)    5  T2 =EMPLOYER S
S TOTAL
2600 '(D5$)    5  YS =EMPLOYER S
S Y-TO-D
2700 '(D6$)    5  TF =EMPLOYER T
OTAL FED. INC. TAX
2800 '(D7$)    5  YF =EMPLOYER T
OTAL FED.INC. TAX Y-TO-D
2900 '(D8$)    5  TU =TOTAL UNIO
N DUES THIS PAY PERIOD
3000 '(D9$)    5  TC =TOTAL CHAR
ITY CONTRIB THIS PAY PERIOD
3100 '(E1$)    5  YC =TOTAL CHAR
ITY CONTRIB Y-TO-D
3200 '(E2$)    5  YL =TOTAL STAT
E INC. TAX Y-TO-D
3300 '(E3$)    5  TL =TOTAL STAT
E INC. TAX
3400 '(E4$)    5  IT =INSURANCE
TOTAL
3500 '(E5$)    5  IY =INSURANCE
Y-TO-D
3600 '
3700 '      CONTROL CODES
3800 '
3900 LF$=CHR$(10):LP$=CHR$(31):S
P$=CHR$(30):FP$=STRING$(32,"#")
4000 FORX=1TO12:READMN$(X):NEXTX
4100 GOTO6700
4200 '
4300 '      SUBROUTINE TO OPEN FI
LE BUFFER
4400 '
4500 OPEN"D",#2,"EMPLOYER",74
4600 FIELD#2,9ASD1$,5ASD2$,5ASD3
$,5ASD4$,5ASD5$,5ASD6$,5ASD7$,5A
SD8$,5ASD9$,5ASE1$,5ASE2$,5ASE3$
,5ASE4$,5ASE5$
4700 RETURN
4800 '
4900 '      LSET EMPLOYER VARIABL
ES
5000 '
5100 GOSUB4600:LSETD1$=MO$:LSETD
2$=MKN$(PT):LSETD3$=MKN$(PY)
5200 LSETD4$=MKN$(T2):LSETD5$=MK
N$(YS):LSETD6$=MKN$(TF)
5300 LSETD7$=MKN$(YF):LSETD8$=MK
N$(TU):LSETD9$=MKN$(TC)
5400 LSETE1$=MKN$(YC):LSETE2$=MK
N$(YL):LSETE3$=MKN$(TL)
5500 RETURN
```

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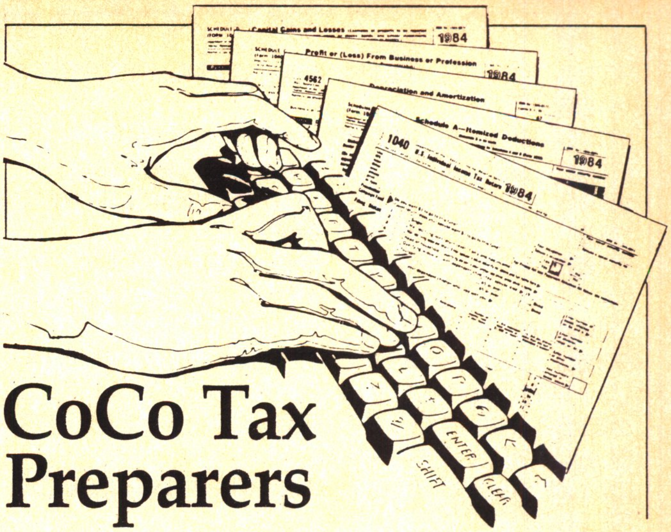
RAINBOW CERTIFICATION SEAL

```
5600 '
5700 '      CONVERT 5 BYTE CODED
STRING
5800 '
5900 PT=CVN(D2$):PY=CVN(D3$):T2=
CVN(D4$):YS=CVN(D5$)
6000 TF=CVN(D6$):YF=CVN(D7$):TU=
CVN(D8$):TC=CVN(D9$)
6100 YC=CVN(E1$):YL=CVN(E2$):TL=
CVN(E3$):IT=CVN(E4$)
6200 IY=CVN(E5$):MO$=D1$
6300 RETURN
6400 '
6500 '      EMPLOYER DATA BASE PR
OGRAM
6600 '
6700 CLS:PRINTFP$;:PRINTTAB(3)"E
MPLOYER DATA BASE PROGRAM"
6800 PRINTFP$:PRINTTAB(10)"PROGR
AM MENU"
6900 PRINT:PRINTTAB(5)"1. RESERV
E FILE SPACE"
7000 PRINTTAB(5)"2. RETREIVE DAT
A RECORD"
7100 PRINTTAB(5)"3. EDIT DATA RE
CORD"
7200 PRINTTAB(5)"4. COMPUTE PAYR
OLL"
7300 PRINTTAB(5)"5. WRITE CHECKS
"
7400 PRINTTAB(5)"6. EMPLOYEE DAT
A BASE"
7500 PRINTTAB(5)"7. END PROGRAM"
7600 PRINT:INPUT"     ENTER ONE O
F THE ABOVE";OA
7700 ON OA GOTO8300,9500,12400,1
7200,17300,17400,7900
7800 GOSUB17800:GOTO6700
7900 END
8000 '
8100 '      RESERVE FILE SPACE
8200 '
8300 GOSUB18500:IFE2$="R"THEN840
0ELSE6700
8400 CLS:PRINT:PRINTTAB(6)"RESER
VING FILE SPACE"
8500 GOSUB4500:GOSUB5100
8600 FORX=1TO12:LSETD1$=MN$(X)
8700 PUT#2,X:NEXTX:CLOSE#2:RESTO
RE:GOTO6700
8800 '
8900 '      DATA STATEMENTS
9000 '
9100 DATAJANUARY,FEBRUARY,MARCH,
APRIL,MAY,JUNE,JULY,AUGUST,SEPTE
MBER,OCTOBER,NOVEMBER,DECEMBER
```



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Signature ______
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```
9200 '
9300 '      RETREIVE DATA RECORD
9400 '
9500 CLS:PRINTFP$;:PRINTTAB(6)"R
ETREIVE DATA RECORD":PRINTFP$
9600 PRINT:PRINT:INPUT"ENTER REC
ORD MONTH";M1$:F2=0
9700 IFM1$="ALL"THEN10200ELSEIFM
1$="NONE"THEN6700
9800 GOSUB4500:FORX=1TO12
9900 IFLEFT$(MN$(X),3)=LEFT$(M1$
,3)THENGET#2,X:X=12:F2=1
10000 NEXTX:IFF2=0THENCLOSE#2:GO
SUB17800:GOTO9500
10100 GOSUB5900:GOSUB10700:CLOSE
#2:GOTO6700
10200 GOSUB4500:FORX=1TO12:GET#2
,X
10300 GOSUB5900:GOSUB10700:NEXTX
:CLOSE#2:GOTO6700
10400 '
10500 '      PRINT DATA RETREIVAL
10600 '
10700 PRINT#-2,LF$;LP$;"EMPLOYER
 RECORD FOR "MO$
10800 PRINT#-2,LF$;LF$;"MONTHLY
TOTALS";LF$;SP$
10900 PRINT#-2,"PAYROLL TOTAL","
SOC.SEC.TOTAL","FED.INC.TAX","ST
ATE TAX TOTAL"
11000 PRINT#-2,USINGF1$;PT;T2;TF
;TL
11100 PRINT#-2,LF$;LF$;LP$;"YEAR
-TO-DATE TOTALS";LF$;SP$
11200 PRINT#-2,"PAYROLL TOTAL","
SOC.SEC.TOTAL","FED.INC.TAX","CO
NTRIBUTIONS"
11300 PRINT#-2,USINGF1$;PY;YS;YF
;YC
11400 PRINT#-2,LF$;LF$;"STATE TA
X TOTAL","INSURANCE TOTAL"
11500 PRINT#-2,USINGF1$;YL;IY
11600 PRINT#-2,LF$;LF$;LP$;"PAY
PERIOD TOTAL";LF$;SP$
11700 PRINT#-2,"UNION DUES","CON
TRIBUTIONS","INSURANCE TOTAL"
11800 PRINT#-2,USINGF1$;TU;TC;IT
11900 PRINT#-2,STRING$(36,10)
12000 PRINT#-2,LF$;LF$;LF$;LF$:R
ETURN
12100 '
12200 '      EDIT DATA RECORDS
12300 '
12400 CLS:PRINTFP$;TAB(8)"EDIT D
ATA RECORDS":PRINTFP$;
12500 PRINT:PRINT:INPUT"ENTER MO
NTH TO EDIT";M1$
12600 IFM1$="NONE"THEN6700
12700 GOSUB4500:F2=0
12800 FORX=1TO12
12900 IFLEFT$(M1$,3)=LEFT$(MN$(X
),3)THENRN=X:F2=1
13000 IFF2=0THENGOSUB17800:CLOSE
#2:GOTO12400
13100 GET#2,RN:GOSUB5900
13200 CLS:PRINTFP$;:PRINTTAB(10)
"EDITOR MENU":PRINTFP$
13300 PRINT:PRINTTAB(2)"1. EDIT
MONTHLY TOTALS"
13400 PRINTTAB(2)"2. EDIT YEAR-T
O-DATE TOTALS"
13500 PRINTTAB(2)"3. EDIT PAY PE
RIOD TOTALS"
13600 PRINTTAB(2)"4. END EDIT FU
NCTION"
13700 PRINT:INPUT"   ENTER ONE O
F THE ABOVE";OA
13800 ON OA GOTO14300,15100,1610
0,16900
13900 GOSUB17800:GOTO13200
14000 '
14100 '      EDIT MONTHLY TOTALS
14200 '
14300 CLS:PRINTFP$;TAB(6)"EDIT M
ONTHLY TOTALS":PRINTFP$:PRINT
14400 PRINT"PAYROLL TOTAL";:INPU
TB1$:IFB1$=""THEN14500ELSEPT=VAL
```

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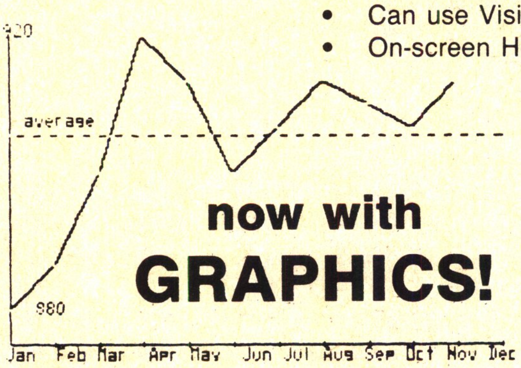

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```
(B1$)
14500 PRINT"SOC.SEC. TOTAL":INPU
TB1$:IFB1$=""THEN14600ELSETS=VAL
(B1$)
14600 PRINT"FED.INC.TOTAL":INPUT
B1$:IFB1$=""THEN14700ELSETF=VAL(
B1$)
14700 GOTO13200
14800 '
14900 '      EDIT YEAR-TO-DATE TO
TALS
15000 '
15100 CLS:PRINTFP$;TAB(4)"EDIT Y
EAR-TO-DATE TOTALS":PRINTFP$
15200 PRINT:PRINT"PAYROLL TOTAL"
:INPUTB1$:IFB1$=""THEN15300ELSEP
Y=VAL(B1$)
15300 PRINT"SOC.SEC. TOTAL":INPU
TB1$:IFB1$=""THEN15400ELSEYS=VAL
(B1$)
15400 PRINT"FED.INC.TOTAL":INPUT
B1$:IFB1$=""THEN15500ELSEYF=VAL(
B1$)
15500 PRINT"CONTRIBUTIONS":INPUT
B1$:IFB1$=""THEN15600ELSEYC=VAL(
B1$)
15600 PRINT"INSURANCE TOTAL":INP
UTB1$:IFB1$=""THEN15700ELSEIY=VA
L(B1$)
15700 GOTO13200
15800 '
15900 '      EDIT PAY PERIOD TOTA
LS
16000 '
16100 CLS:PRINTFP$;TAB(5)"EDIT P
AY PERIOD TOTAL":PRINTFP$;
16200 PRINT:PRINT"UNION DUES":IN
PUTB1$:IFB1$=""THEN16300ELSETU=V
AL(B1$)
16300 PRINT"CONTRIBUTIONS":INPUT
B1$:IFB1$=""THEN16400ELSETC=VAL(
B1$)
16400 PRINT"INSURANCE TOTAL":INP
UTB1$:IFB1$=""THEN16500ELSEIT=VA
L(B1$)
16500 GOTO13200
16600 '
16700 '      END EDIT FUNCTION
16800 '
16900 GOSUB5100:PUT#2,RN
17000 CLOSE#2:GOTO6700
17100 END
17200 CLS:PRINTFP$;:PRINTTAB(8)"
ONE MOMENT PLEASE":PRINTFP$:RUN"
COMPUTE"
17300 CLS:PRINTFP$;:PRINTTAB(8)"
ONE MOMENT PLEASE":PRINTFP$:RUN"
CKWRITER"
17400 CLS:PRINTFP$;:PRINTTAB(8)"
ONE MOMENT PLEASE":PRINTFP$:RUN"
EMPLOYEE"
17500 '
17600 '      ERROR ROUTINE
17700 '
17800 FOR X=1 TO 10:CLS
17900 FOR T=1 TO 50:NEXT T
18000 PRINT@233,"ILLEGAL ENTRY":
SOUND 100,1
18100 FOR Y=1 TO 50:NEXT Y,X:CLS
:RETURN
18200 '
18300 '      WARNING ROUTINE
18400 '
18500 CLS:PRINTFP$:PRINTTAB(12)"
warning":PRINT:PRINT" RESERVING
DISK FILE SPACE WILL     DESTROY
ANY PAYROLL RECORDS         CURR
ENTLY ON DISK!!":PRINT:PRINTFP$
18600 FORX=1TO20:SOUND100,1:FORY
=1TO20:NEXTY,X
18700 PRINT:PRINT"PRESS <ENTER>
TO RETURN TO MENU"
18800 PRINT"PRESS r <ENTER> TO R
ESERVE SPACE"
18900 E2$=INKEY$:IFE2$=""THEN189
00
19000 RETURN
```

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Answer The Challenge Of The Demon's Defiance

By Fred B. Scerbo
Rainbow Contributing Editor

Editor's Note: If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. Remember, keep your ideas specific, and don't forget that this is BASIC. All programs resulting from your wishes are for your use but remain the property of the author.

The "Wishing Well" is a little over a year old now, and the ideas and wishes keep pouring in at a steady pace. Some are quite good; others are totally off the wall.

The biggest problem I have found in writing this kind of column is trying to come up with material which is useful and interesting to the greatest number of readers and CoCo users. Unfortunately, too many readers have not taken this into consideration when making suggestions. Please do not be offended if I cannot elect to write the one program you need that no one else in the world could use.

Still, quite often, some wishes will have a thread of an idea which will serve as the stimulus for a full-blown project and program listing. This month's listing is one such example.

Some readers have asked when they would get to see another "Scerbo Color Computer Game." As I gave it some thought, I realized that I had not published a real game since the appearance of *Snail's Revenge* in the Second Anniversary Issue in July of 1983. Seeing that this is now 1985, I came to the conclusion that the "Wishing Well" was in need of a game. (After all, being almost two years between games is stretching it a bit, so I figured the time was ripe for a little fun and games.)

Therefore, if this month's "Wishing Well" looks shorter than usual, don't be surprised. A game does not require the technical detail and background that some other articles have required. Don't worry. You're not getting cheated. Those of you who still don't have RAINBOW ON TAPE will find that this short listing will be easy to type in. Besides, I really believe that the game you have listed here will be equal in speed, color and challenge level to some games you may be paying for.

The Wish

Almost two years ago I purchased the first of my two MC-10 Color Computers. As you are well aware, software for this compact little model was and still remains largely nonexistent. I quickly wrote up a number of programs which would fit into 4K and still take advantage of the beauty and color of the Microsoft BASIC which Tandy so wisely put into its computers.

One such program was a mini-arcade game called *Demon's Defiance*. The game was much like the space-bird games available for home arcade games and incorporated some of the features of the color *Breakout*-style games which date back to the early days of *Pong*.

To fit into 4K, the BASIC code I wrote had to be extremely small and efficient. Every single byte had to be efficiently utilized. There was no room for waste. Therefore, *Demon* had almost nothing for a title-card, no skill levels, and had to rely totally on the keyboard and space bar for action since the MC-10 had no provision for a joystick.

The resulting program was delivered to The Programmer's Guild. Unfortunately, the market for MC-10 software appeared to be as big as the market for the MC-10 itself. (Tandy dropped

(Fred Scerbo is a special needs instructor for the North Adams Public Schools. He holds a master's in education and published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.)

the MC-10 from its line last year due to poor sales.) So much for *Demon*.

When I decided to offer up a game here in the "Well" in response to your requests for one, the idea came along to revive *Demon* in a new and enhanced form. With a little work, *Demon* became *Demon's Defiance II.* The code is still very efficient but some new features have been added.

First, *Demon II* can use either the right joystick or the arrow keys and space bar for action. Next, I have included the option for using the high-speed poke to allow for a fast or slow game. Believe me, you are going to be very surprised to see how good and rapid a game we can generate without using Hi-Res graphics.

The Program

A few things should be kept in mind before you try typing in or using this program. First, since it uses the `POKE65495,0` for high speed, keep in mind that some CoCos might not be able to use the poke (especially the older ones or some Color BASIC machines). If your CoCo cannot use the `POKE` or if you have only Color BASIC, then delete lines 240, 250, 260 and 270.

Secondly, make sure you save the program before running it. If you do run it first, be sure to `POKE65494,0` to slow down the computer before you try to save it or you will lose the whole program.

Next, since the program uses a lot of screen `POKE`s, be sure to check the accuracy of your typing before running the game. A wrong `POKE`, and poof goes the program into the twilight zone of a locked-up computer.

Another area of concern should be your accuracy in typing in the `DATA` statements at the beginning. Some lines have groups of just commas, so do not leave any out. The `DATA` creates the colorful title card which was missing from the original *Demon*.

You will notice that some lines include lowercase letters in the listing. Be sure to press SHIFT 0 to get the reversed lowercase letters. Shift again to finish typing any uppercase letters. This should be no problem for any of you who are old pros at CoCo programming but might be new to our newer owners.

Finally, those of you with 16K Extended computers may wish to `PCLEAR 1` before keying in the listing. This should free up enough memory for those of you who need it. (It is always hard for me to tell how these will fit since I do the programming on a 64K machine. A `PCLEAR 1` never hurts, but 16K Color BASIC users will not need or be able to use this command.)

The Illusion

There are a few tricks which I used in this program to greatly speed up the action. One trick involves the positioning of the shots you fire up the screen. Rather than draw the shot all the way up the screen and have to reset it after each appearance, I only have the shot appear a few times on the screen. This will give the illusion of it traveling up the screen but does not waste the time and memory of drawing it all the way up the screen. When you see the results, you will be amazed how well this technique works.

Also, rather than check to see if a square is set or not, I have stored that information in a multi-dimensional array. Checking the array is much faster than testing the screen. The speed we pick up is impressive and you will never notice that this is the method we are using.

> ***" . . . you are going to be very surprised to see how good and rapid a game we can generate without using Hi-Res graphics."***

The Demon bird actually appears to fly by printing two different positions of the bird on top of each other over and over again. This flapping gives the illusion of a flying bird.

Overall, these simple illusions go a long way toward making this game look arcade quality.

Playing the Game

Demon's Defiance II is actually quite easy to play, but tough to master. You control a cannon at the bottom of the screen. A Demon bird hovers over you firing laser bolts at you. You can shoot the bird, but your main goal is to blast out the colorful force shield at the top of the screen.

Unfortunately, the Demon has help. A neutralizer beneath your cannon will destroy you if you fire while the red square is directly below your cannon. You only get five lives to start with.

Clear the screen and you will gain a new life. Your score and lives are recorded at the bottom of the screen.

Sound easy? Well, here is where the skill level comes in. As you blast out the shield, the Demon will rebuild parts of it. Level one does not rebuild the shield but higher levels will at increasing speed. This new feature really makes *Demon II* a lot of fun and rather difficult to completely master. When the game has ended, pressing ENTER will rerun the program.

In time, I expect to see some of you listing your high scores in THE RAINBOW Scoreboard.

Is this efficient BASIC code? Well, the actual game lines only take up about 60 short lines. By the efficient placing of `IF/THEN` statements, the program runs in a relatively straight line with little looping or messy, misplaced subroutines.

Another way in which I kept the speed fast was by not making this listing work on an MC-10 as some of my other recent Color BASIC programs have. As you may recall, in those I included a variable MC which was equal to the offset value for the screen pokes on the MC-10. If I had included this value, the program would really have slowed down and taken up much more memory.

Besides, it would never still fit in 4K as the original *Demon* did. Therefore, those of you with MC-10s will have to try to track down a copy of the original *Demon* if you really want it. (My guess is that very few CoCo programmers have *only* an MC-10. Odds are, if you have RAINBOW, you have a regular CoCo as well.)

Conclusion

There you have it: a small, efficient, rapid, colorful CoCo game. I tried translating this to the VIC-20 just to see how it would work and let me tell you, I gave up after a week. Many of you don't realize how lucky you are to have such an easy-to-use language in the CoCo. The Commodore language is an absolute nightmare when it comes to screen positioning of character codes.

Now that I have gotten my feet wet into game programming again, you may see a few more brand new games popping up in upcoming months. I might even create *Snail III* or *Snail: The Final Chapter* for an upcoming issue like the anniversary issue. Some of you might want to suggest some game concepts or ideas in your wishes.

Somewhere inside me, I do have a graphics Adventure floating around, but I am waiting for just the right stimulus to come along so I can make it an absolute killer. (Wait! Maybe a game with killer bees would work, or a Michael Jackson takeoff game or . . . see how easy it is to get started?) Only time will tell.

Oops! Some Corrections

I have taken great care in trying to keep the "Wishing Well" free from errors, but as can be expected, some quirks have worked their way into the mechanism.

For example, some copies of the Text Version of the *Screen Quiz Programs* on RAINBOW ON TAPE ended up with the word `NEXT` included in every single `DATA` line. I don't know how it got there. It is not on the paper list, but somehow it crawled onto the RAINBOW ON TAPE. If you have such a copy, just edit out the word `NEXT` in each `DATA` line at the end.

Another reader wrote to point out that the check sum values do not work on some listings if you are using them (you know, those funny numbers at the top of the list). Since I write these programs using a full screen editor, sometimes a few blank spaces get included at the end of the line. This totally throws off the check sum values. I have tried to solve this by using the regular `EDIT` command to reedit the end of each line after the program is finished so that this does not occur again. Sorry!

Finally, a few readers had problems with the *CoCo Tournament Programs* from a few months ago. There are not any real errors in the listing. The errors some of you have gotten have come from not understanding fully how to use the logic of the program, which is probably my fault anyway.

For example, in an eight-man bracket, some of you found the computer would lock up if you included eight names and only ranked the first seven.

If you stop to think about it, you are asking the computer to solve a problem which it cannot do with the formula I have written. Logically, if you have ranked seven of eight players, you have, in fact, ranked the remaining player in position eight. Therefore, this problem is avoided if you only rank six, or rank all eight in the `DATA` line. The same goes with 15 out of 16, just rank all 16.

Also, you cannot rank zero players. You must rank at least the first or you will get an OD Error. Again, this is the way the logic in the formula has to be written or else we would have to include quite a few `IF/THEN` statements.

Finally, when you are doing the ranking of all eight, or all 16, you should include the following line:

For eight bracket:

```
194 IF NW=8 THEN FOR I=1TONW:
PR$(I)=PL$(I):NEXT:GOTO274
```

For sixteen bracket:

```
194 IF NW=16 THEN FOR I=1TONW:
PR$(I)=PL$(I):NEXT:GOTO278
```

Somehow, these lines got left out of the listings. This should clear up any problems some of you may have with the programs.

Again, thanks for pointing these out. The instances in which these errors would occur just never came up because of the way in which I was using the program.

```
150 .......78
270 ......196
380 .......23
590 ......246
780 .......18
END .....172
```

The listing:

```
10 REM**************************
20 REM* DEMON'S DEFIANCE  II   *
30 REM*  BY  FRED B. SCERBO    *
40 REM*   149 BARBOUR ST.      *
50 REM* NORTH ADAMS, MA 01247 *
60 REM*  COPYRIGHT (C)  1984   *
70 REM**************************
80 CLS0:FORI=1056TO1247:READ A:I
FA=0THENA=128
90 POKEI,A:NEXTI
100 PRINT@238,CHR$(221)CHR$(222)
CHR$(221)CHR$(222);
110 PRINT@270,CHR$(215)CHR$(219)
CHR$(215)CHR$(219);
120 DATA,255,252,251,,255,252,25
2,,255,242,241,255,,255,252,255,
,255,251,240,255,,,253,,,255,252
,252,,
130 DATA,255,240,255,,255,252,25
2,,255,244,248,255,,255,240,255,
,255,244,251,255,,,,,,252,252,25
5,,
140 DATA,252,252,248,,252,252,25
2,,252,240,240,252,,252,252,252,
,252,240,244,252,,,,,,252,252,25
2,,
150 DATA175,172,171,,175,172,172
,,175,172,172,,164,175,168,,167,
172,171,,175,171,160,175,,175,17
2,172,,175,172,172
160 DATA175,160,175,,175,172,172
,,175,172,172,,160,175,160,,175,
172,175,,175,164,171,175,,175,16
0,160,,175,172,172
170 DATA172,172,168,,172,172,172
,,172,160,160,,164,172,168,,172,
160,172,,172,160,164,172,,172,17
2,172,,172,172,172
180 CLEAR80:U$=CHR$(128)
190 PRINT@328,"by"U$"fred"U$"b"U
$"scerbo";:POKE1354,32:POKE1359,
32:POKE1361,46
200 PRINT@359,"copyright"U$U$"c"
;:POKE1392,32:POKE1393,40:POKE13
95,41:POKE1396,32:POKE1397,49:PO
KE1398,57:POKE1399,56:POKE1400,5
2
210 PRINT@389,"j"U$"oystick"U$"o
r"U$U$"k"U$"eyboard";:POKE1412,4
```

```
0:POKE1414,41:POKE1422,32:POKE14
25,32:POKE1426,40:POKE1428,41
220 X$=INKEY$:IFX$=""THEN220
230 IFX$="J"THEN JS=1 ELSEIFX$="
K"THEN JS=0 ELSE220
240 PRINT@425,"f"U$"ast"U$"or"U$
U$"s"U$"low";:POKE1448,40:POKE14
50,41:POKE1454,32:POKE1457,32:PO
KE1458,40:POKE1460,41
250 X$=INKEY$:IFX$="F"THEN260ELS
EIFX$="S"THEN270ELSE250
260 POKE65495,0:GOTO280
270 POKE65494,0
280 PRINT@452,"select"U$"skill"U
$"level";:POKE1482,32:POKE1488,3
2:POKE1494,32:POKE1495,40:POKE14
96,49:POKE1497,45:POKE1498,57:PO
KE1499,41
290 X$=INKEY$:IFX$=""THEN290
300 SL=VAL(X$):IFSL<1THEN290ELSE
IFSL>9THEN290
310 WL=109-(SL*8)
320 DIM T(14,4):CLS0:U=1:G=12:Y=
13:B$=U$:PD=4
330 KA$=CHR$(152)+CHR$(146)+CHR$
(152):KB$=CHR$(146)+CHR$(148)+CH
R$(148):KC$=CHR$(145)+CHR$(145)+
CHR$(148)
340 UB$=B$+CHR$(230)+CHR$(236)+C
HR$(226)+CHR$(225)+CHR$(236)+CHR
$(233)+B$:UL$=B$+CHR$(244)+CHR$(
248)+B$
350 DB$=B$+CHR$(228)+CHR$(227)+B
$+B$+CHR$(227)+CHR$(232)+B$:DL$=
B$+CHR$(249)+CHR$(246)+B$:GOSUB3
60:GOTO390
360 QW=0:FORI=1TO14:FORY=1TO4:T(
I,Y)=0:NEXTY,I:FORI=2TO29:PRINT@
I,CHR$(159);
370 PRINT@I+32,CHR$(207);:PRINT@
I+64,CHR$(223);:PRINT@I+96,CHR$(
175);:NEXTI:PD=PD+1:POKE1530,PD+
48
380 FORI=128TO256:PRINT@I,B$;:NE
XT:RETURN
390 FORWW=418TO445:PRINT@WW,CHR$
(252);:NEXTWW:PRINTCHR$(248);:PR
INT@482,"score";:PRINT@500,"live
s";
400 G$=B$+B$+CHR$(215)+CHR$(213)
+CHR$(210)+B$+B$
410 PRINT@384+G,G$;
420 IFQW=>112THENGOSUB360
430 W=RND(6):IFW>3THEN450
440 Y=Y+1:GOTO460
450 Y=Y-1:IFY<=0THENY=0
```

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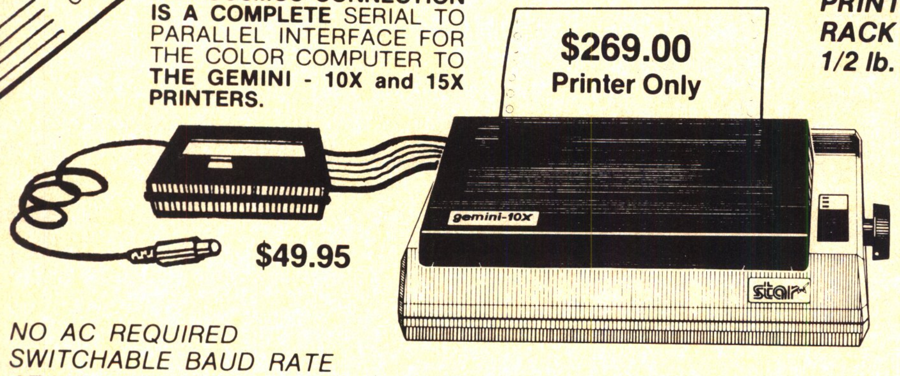

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```
460 IFY=>24THENY=24
470 IFS=1THEN530
480 E=RND(6):IFE>5THENS=1
490 RB=RND(100):IFRB<WL THEN520
500 RC=RND(4):RD=RND(14):IF T(RD
,RC)=0THEN520
510 SC=5-RC:PRINT@((SC-1)*32+RD*
2),CHR$(239)CHR$(239);:T(RD,RC)=
0:QW=QW-2
520 GOSUB530:GOTO540
530 PRINT@192+Y,UB$;:PRINT@226+Y
,UL$;:RETURN
540 IFS=0THEN620
550 FORH=64TO192STEP32:PRINT@195
+Y+H,CHR$(154)CHR$(149);:NEXT:FO
RH=64TO192STEP32:PRINT@195+Y+H,B
$B$;:NEXT:SOUND10,1:S=0
560 IFY+1-G>2ORG-Y-1>2THEN620
570 GOSUB580:GOTO620
580 FORJL=1TO2:PRINT@320+G,KA$KB
$;:PRINT@352+G,KB$KC$;:PRINT@384
+G,KC$KA$;:SOUND255,1:PRINT@320+
G,KB$KC$;:PRINT@352+G,KC$KA$;
590 PRINT@384+G,KA$KB$;:SOUND100
,1:NEXTJL:PRINT@320+G,B$B$B$B$B$
B$;:PRINT@352+G,B$B$B$B$B$B$;:PR
INT@384+G,B$B$B$B$B$B$;
600 G=RND(13)*2:PRINT@384+G,G$;:
PD=PD-1:POKE1530,PD+48
610 IFPD<=0THEN890
620 SOUND255,1
630 GOSUB640:GOTO650
640 PRINT@192+Y,DB$;:PRINT@226+Y
,DL$;:RETURN
650 F=RND(2):IF F>1THEN670
660 F=RND(13)*2:PRINT@448+U,B$B$
B$;:PRINT@448+F,CHR$(188)CHR$(18
8)CHR$(184);:U=F
670 IFJS=0THEN700
680 IFPEEK(339)=254THEN780
690 JP=JOYSTK(0):IFJP<25THEN740E
LSEIFJP>38THEN760ELSE430
700 X$=INKEY$:IFX$=CHR$(32)THEN7
80
710 IFX$=CHR$(9)THEN760
720 IFX$=CHR$(8)THEN740
730 GOTO430
740 G=G-2:IFG<=0THENG=0
750 GOTO770
760 G=G+2:IFG=>26THENG=26
770 PRINT@384+G,G$;:GOTO430
780 IF U-2=G THEN580
790 SOUND30,1:FORH=0TO224STEP64:
PRINT@G+355-H,CHR$(154);:PRINT@G
+355-H,B$;:NEXTH
800 IFG-Y>3ORY-G>3THEN830
810 FORO=1TO2:PRINT@192+Y,KA$KB$
;:PRINT@224+Y,KB$KC$;:SOUND1,1:P
RINT@192+Y,KC$KA$;:PRINT@224+Y,K
A$KB$;:NEXTO
820 PRINT@192+Y,B$B$B$B$B$B$B$
;:PRINT@224+Y,B$B$B$B$B$B$B$;:
GS=GS+100:Y=RND(24):GOSUB880:GOT
O420
830 LV=1
840 R=(G+2)/2:IFT(R,LV)=1THEN860
850 GOSUB530:QW=QW+2:T(R,LV)=1:P
RINT@G+354-(H+32*(LV-1)),B$B$;:G
OSUB640:GS=GS+(25*LV):GOSUB880:G
OTO420
860 LV=LV+1:IFLV>4THEN420
870 GOTO840
880 GOSUB530:GS$=STR$(GS):P=LEN(
GS$):FORW=1TOP:Z=ASC(MID$(GS$,W,
1)):POKE1510+W,Z:NEXTW:GOSUB640:
RETURN
890 PRINT@267,"game"+B$+"over";
900 IFINKEY$=CHR$(13)THEN RUN
910 GOTO900
```

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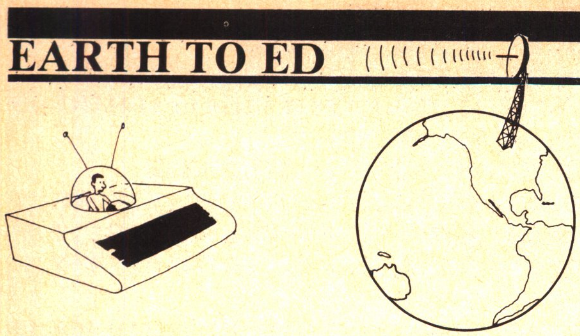

There've Been Some Changes Made . . .

By Ed Ellers
Rainbow Technical Writer

I'm departing from the usual Q & A for a bit to fill you in on some recent CoCo developments. First of all, there has been a lot of talk about the Korean CoCo. (Bob Rosen, of Spectrum Projects, suggests it should be called the KoCo!) So far, the CoCos made by TC Electronics Korea have been 16K models only (the model numbers are 26-3134 for non-Extended and 3136 for Extended). A 64K Extended model from Korea (26-3137) is expected in a few months after stocks of the 64Ks made in Fort Worth dwindle.

There are actually two different versions of CoCos made in South Korea for the U.S. market. (A writer from Holland sent me pictures of the Korean CoCo for the European PAL color TV system; it's similar to the first version in the U.S.) The first machines were very much like the American-made CoCo 2s, with a few minor changes and the fact that many of the chips are now soldered in. The RAM chips are arranged somewhat differently, with five on the bottom row of the board (under the keyboard) and the other three on the row above them. Upgrading this version to 64K is just as easy as on earlier CoCo 2s; you just replace the RAMs with a set of eight 4164 chips and solder across two holes in the board, which are now in a box marked 64K. Incidentally, many suppliers are now selling 64K RAMs in sets of *nine*; these are for the IBM PC and many of the "compatibles" (including the Tandy 1200), which use the ninth bit for a parity checking feature. If you find that you can buy a set of nine from one supplier cheaper than sets of eight from others, there's nothing wrong with buying nine and using eight. (The extra chip might come in handy for repairs later.)

Few computers use the "standard" 4116 16K-by-1 bit RAM chips anymore (the CoCo is the only one still on the U.S. market that I know of). The later CoCo 2s from Korea (the 26-3134A and 3136A) are now using Texas Instruments 4416 RAM chips. These are 16K-by-4 bit chips, so *only two are used*, instead of the previous eight. These new chips take an addressing scheme different from that of regular chips, so Motorola's new 74LS785 SAM chip is used instead of the 74LS783 (formerly 6883) used with "standard" RAMs. Color BASIC has been patched (again!) to set up the SAM chip for the 4416s; this new version, called Color BASIC 1.3, apparently is otherwise identical to the "new ROM" 1.2 version. Marty Goodman of Cheshire Cat Software disassembled 1.3 and compared it to 1.2, and he tells me that he believes all programs that work on "new ROM" machines will still work. (Extended BASIC 1.1 was not changed, and Disk BASIC 1.0 and 1.1 still work fine.)

Sadly, for those of us who "do it ourselves," the "A version" Korean CoCos are much more difficult to upgrade than the previous models. First of all, the upgrade to 64K RAM is complicated by the fact that the new machines won't accept 64K-by-4 bit RAMs (the SAM can't address them, and BASIC 1.3 doesn't have the needed code) and there are no sockets for regular 64K chips. There are two 12-pin edge connectors on the board that apparently will take a "piggyback" board for 4164 RAMs, but Tandy doesn't have this available yet. (The upgrades that they are doing are apparently done by putting in an entire main board with regular RAMs; since the old 16K boards can then be used to repair defective 16K machines, this may actually be cheaper for them with the amount of repair and upgrade work Radio Shack does.) Secondly, the two ROM sockets (one for Extended BASIC) have been replaced by a single 28-pin socket that takes either a 24-pin Color BASIC ROM or a 28-pin ROM for both Color BASIC and Extended BASIC. (In the 3136A model which is factory-equipped with Extended BASIC, the ROM is soldered in.) To put in Extended BASIC you will have to order a different part, which should be no problem if you are ordering from Tandy's

---

(Ed Ellers, a RAINBOW and PCM staff member, is a self-confessed electronics fanatic whose other interests include science fiction.)

National Parts Department, but may be trouble if you try to get it from a mail-order house (they should have it soon, though). I'm also told by Bob Rosen that this socket can be modified with one wire to take either Tandy's ROM or a 27128 EPROM. There are also a number of jumpers that have to be changed when upgrading to Extended BASIC; these are marked 128K, which refers to the 128K-bit total of a 16K-byte ROM.

There have also been some changes in the CoCo product line. The Multi-Pak Interface (26-3124) has been redesigned to match the size of the CoCo 2, and the first disk drive kit (26-3129) now uses "thinline" drives, meaning you can put two drives in a single case. Finally, the TRS-80 nameplate is going by the boards; all new computer products sold by Radio Shack (and many existing ones, like the CoCo, in a few months) will carry the Tandy name already found on the 200, 1000, 1200 HD and 2000.

Now to the letters.

Video Output for PAL Computers

- *As my family and I are proud owners of a CoCo 2 (16K Extended), my problems have started to develop. The Tandy Group in Holland is not very helpful in supplying the information I require, except that after four months one of their representatives mentioned your magazine, which is hard to get in Holland and rather expensive. I hope you are willing to answer some questions, and not only in the magazine, as this will take me a long time to wait.*

What type of board do we have?

How do I connect a monitor to the CoCo via video input or, even better, the RGB input?

Wolfgang Beekman
Oisterwijk, The Netherlands

From looking at the pictures you sent, it looks like your machine is nearly the same as the first version of the Korean CoCo sold in the U.S. Upgrading it to 64K should pose no problem if you just insert the 4164 RAMs and solder across the 64K jumper as I explained in my commentary above.

Unfortunately, hooking up a monitor may be more difficult. The U.S. CoCo (made for the NTSC system) uses a 6847 video generator and an MC1372 encoder chip together to generate the TV signal. The PAL (Phase Alternation by Line, the system used in most European countries) version also uses these two chips, but also has some added circuitry to generate the PAL phase alternation. Because of this, the commonly available video output modification kits (such as the ones sold by Moreton Bay, Mark Data, Computerware and others) may not provide a proper PAL signal. I've never seen a PAL CoCo, since they aren't sold in this country, so I really don't know. If you want to use a monochrome monitor, one of these kits should do the job, since the monochrome signal goes from the 6847 to the 1372 in the same way and the kits take it off there.

Screen Print Troubles

- *I have a problem with Radio Shack's screen print program. I realize that this program was designed for a 16K computer, but I have a 64K machine. I tried upgrading it to 32K with the utility described in the October issue without success.*

Bob Conklin
Milwaukee, WI

- *I'm wondering if other people have had trouble using Radio Shack's* Hi-Res Screen Print Utilities *with the CGP-220 Ink-Jet Printer. A Radio Shack salesman has been unable to give me any help, despite making several phone calls.*

Richard Volans
Ogdensburg, NY

I'm going on the assumption that Radio Shack's current screen print driver (*BWDUMP* on one side, *CODUMP* on the other) is being used. To use either of these programs in a 32K or 64K machine, you first `CLEAR 200,31232` and then `CLOADM ''program'',16384:EXEC`. The value 16384 tells the CoCo that the program should be loaded 16384 bytes (exactly 16K) higher than the addresses in the file. The `EXEC` address is corrected automatically.

On the color dump program, the printer should be set to 2400 Baud using the switch on the back (see the CGP-220 manual for details). *CODUMP* sets the CoCo to 2400 Baud automatically. If you have a serial-to-parallel interface, you can run at speeds as high as 9600 Baud, but you will need to poke in the appropriate value after executing *CODUMP*. (The CGP-220 doesn't have a switch to select parallel or serial input; just plug into one connector or the other and disconnect whatever was plugged into the other jack.)

The Multilingual CoCo

- *I will be attenaing college soon, and am in need of programs that will assist me in the data processing field. The languages studied will be COBOL and PASCAL. I would appreciate any information on this subject.*

James Allen Hall
Castlewood, VA

There are several PASCAL compiler packages on the market for the CoCo; one that comes to mind is *DEFT Pascal* from DEFT Systems. COBOL will be more difficult; I've heard that there are COBOL compilers available for OS-9 based systems, but I don't know who sells them or even if they will run on OS-9 Level I (which is the version used on the CoCo). From looking at packages for other systems (MS-DOS, UNIX, CP/M, etc.) I'd say that a COBOL compiler would also be very expensive.

Deluxe, Advanced, Super-Duper, New and Improved . . .

- *I have just purchased a 64K CoCo 2 and I've noticed some interesting things in the new* Getting Started With Extended Color BASIC *manual. On pages 199 and 200 there are notes in the margin to "Deluxe Color Computer" and "Advanced Color BASIC." In the text, it mentions that on the Deluxe CoCo we should use the "CTRL key" instead of the up-arrow in some situations. Did I just buy a new computer that is going to be replaced?*

Eugene J. Resch
Alexandria, VA

I've seen some of these references, though I hadn't heard of Advanced Color BASIC. Rumors about a Deluxe CoCo (a.k.a. CoCo 3), with such goodies as 128K RAM, true lowercase and a parallel printer port have been floating around for over a year now. The best that I've been able to make of it is that Radio Shack was planning to introduce the Deluxe CoCo (hence the notes in the manual) but dropped it at the last minute. I don't see any indication that the CoCo 2 will be dropped, however.

More BASIC Differences

- *I own a SpectraVideo SV-328, and its BASIC appears to be very similar to that of the CoCo. My machine uses Microsoft BASIC, with the main added commands being* `PLAY`, `SOUND`, `BEEP`, `PSET`, `PRESET` *and* `DRAW`. *These commands make the listings look very similar. Do you know where I could get a list of CoCo commands and explanations on how they work?*

Todd Davies
Donnybrook, West Australia

The best things to look at are Radio Shack's own Color BASIC and Extended Color BASIC manuals, which are available at any Radio Shack store (Tandy Electronics stores overseas). Microsoft, which wrote the BASIC interpreters for the CoCo, the SpectraVideo machines and most other microcomputers, generally puts the same BASIC syntax in each, though which actual commands are there depends on what the manufacturer wants for his product, how much memory is available and what sort of video display, sound, joystick and other circuitry is available. I suspect that most CoCo programs, which have gotten very sophisticated, will have to be reworked extensively to run on your computer. (You might also look into some of the British magazines, which are now carrying listings for the MSX computers; *MSX* magazine, published in Japan, carries listings as well, though the articles are in Japanese.)

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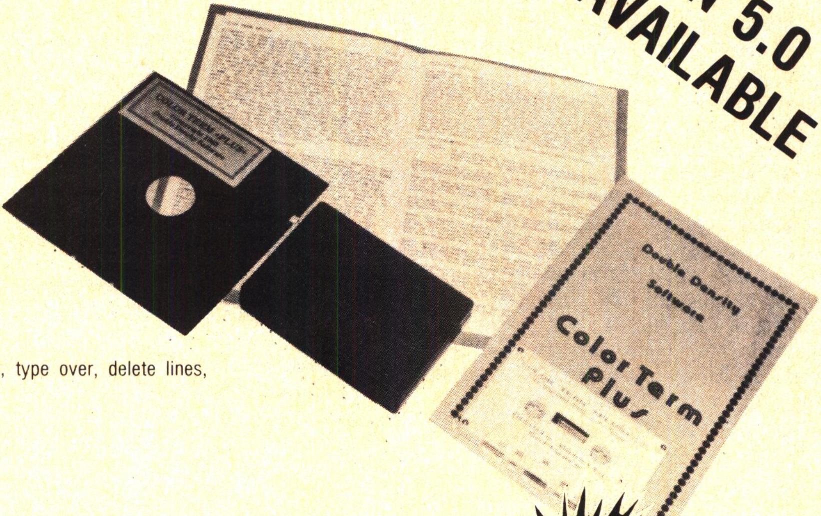

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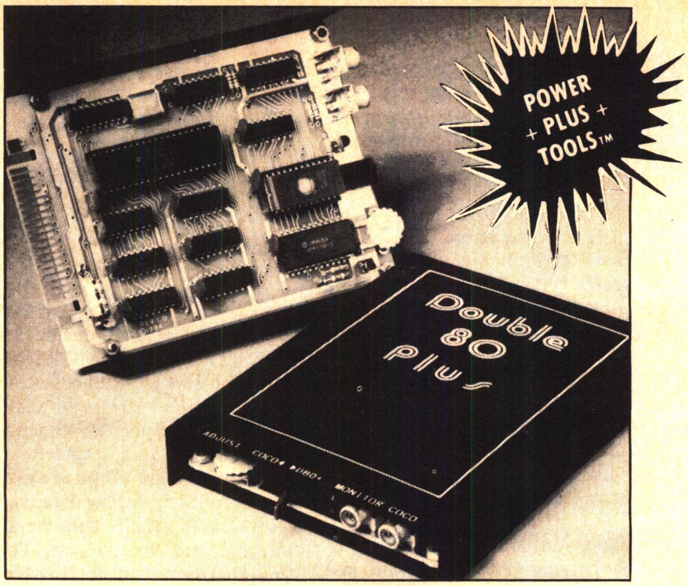

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- Send all 128 characters from keyboard

Buffer:
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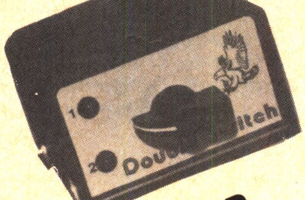

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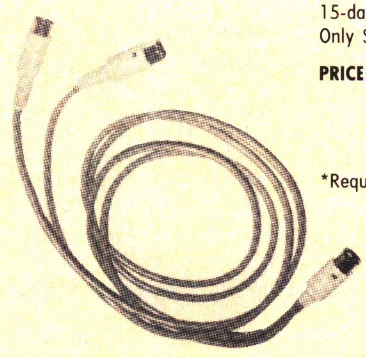

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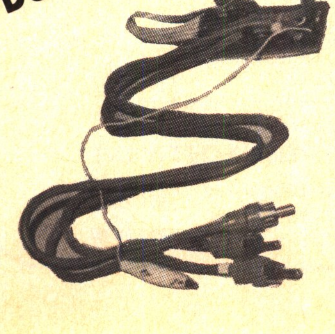

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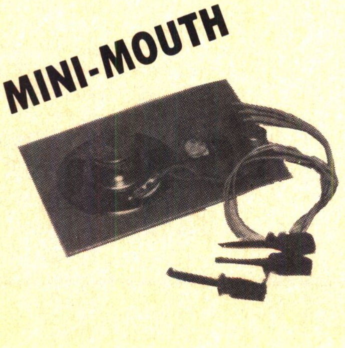

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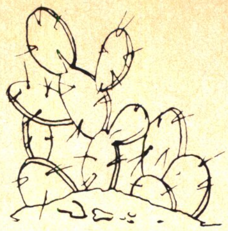

TO PRESERVE QUANDIC — NEW!!!

It has been a long time since we were really excited about an adventure game. Adventure In Wonderland was and is the best text adventure ever written for the Color Computer. We said so, and reviewers agreed!

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Quite simply, **TO PRESERVE QUANDIC** sets a new standard for adventure games on the Color Computer.

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TO PRESERVE QUANDIC, you must find and return the missing piece of the time machine, and the clock is running . . . If you think you are ready for the best graphics adventure ever written for the Color Computer, don't miss **TO PRESERVE QUANDIC.** Packaged on two disks in a quality vinyl library case. Requires 32K and 1 disk drive. If you don't have a disk drive, it will be worth buying one just for this game. **$39.95**

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Adventure in Wonderland — Rainbow magazine reviewers agreed this was the best adventure ever written for the color computer. It incorporates an artificial intelligence and has a vocabulary of over 500 words. Don't miss this one. Req. 32K tape — **$24.95;** Disk — **$29.95**

Super Astrology — This program calculates complete natal horoscopes to an accuracy of aboaut one minute of arc. All you need to know is the time and place of birth. Req. 32K Tape — **$24.95;** Disk — **$29.95**

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Monsters & Magic — This fantasy text simulation is a combat oriented game for fantasy gamers. It contains 50 different monsters to fight, a dungeon with over 1000 different place descriptions and lots of surprises. Tape - **$24.95;** Disk - **$29.95**

Compleat Enchanter — A 100% GRAPHICS adventure with tons of rooms, lots of options and magic. 32K req. Tape - **$24.95;** Disk - **$29.95**

STATISTICS

Lizpac — Absolute the most complete statistics package we have seen for ANY computer anywhere. Lizpack is 850,000 Bytes of programming filling 7 disks with an eighth disk containing data files to be used in the examples. The 200 page manual completely explains all that Lizpac has to offer. It is user friendly. Req. 32K disk only. **$195.00**

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Airnav — This professional flight planner is powerful and user-friendly, too. Developed by a Commercial Airline Pilot this program takes only two minutes to produce a complete flight pan plan on your screen or printer. This program package is for disk system only (32K) and is shipped with complete instructions in a quality binder. If you fly, you need AIRNAV. **$99.95**

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Home Financial Statement

. . . *Forming habits beneficial to your financial health*

By Roland B. Portillo

I don't know how it is in your family, but these days it seems that no matter how careful we are with our money, there never seems to be enough at the end of the month. I always wondered where it all was going.

As a result, I knew that this would be a perfect job for a great record-keeper, my Color Computer. So, I wrote a program that would not only show how much money was going to individual expenses each month, but that would accumulate expenses for the year-to-date, as well as express every expense as a percentage of gross income.

This would be a great help at tax time, too. By forcing myself to keep a daily record of expenses, and keeping all the receipts, I have a pretty good idea what I spent, for instance, on items on which sales tax was paid. By making simple calculations, maybe I could beat the sales tax tables (which always seem too low!).

If you are really serious about keeping track of your finances, you *must* keep a detailed record of what you spend and what you spend it on. I keep a clipboard on my desk, where every day I write down this information as soon as I walk in the door. You may want to keep a small tablet handy to make notes throughout the day. I admit, it's somewhat of a nuisance, but it quickly becomes habit. At least, this is a habit that could be beneficial to your financial health.

About the Program

The program uses a little over 8.5K, so it will work on a 16K Extended BASIC machine. It's designed for one disk, but can be adapted to work on a cassette-based machine with not too much effort.

As is the case with most financial type programs, this one also requires a printer. In this instance, the printer codes are for an Epson MX-80.

Epson Printer Codes:

The printer codes in lines 640, 850, 930, 940, and 950 may vary for your printer. For an Epson they are as follows:

`CHR$(14)` - Double Width Letters

Income Statment
For Month Ending Test Statement

Sources of Income	Month	Percent	Y.T.D	Percent
Husband's salary	2,554.36	48.5	31,896.10	48.7
Wife's salary	2,049.60	39.0	27,121.80	41.4
Overtime	413.12	7.9	3,780.15	5.8
Interest earned	242.55	4.6	2,573.08	3.9
Miscellaneous income	2.25	0.0	94.32	0.1
Total	5,261.88	100.0	65,465.45	100.0
Withholding and Payments				
F.I.C.A.	165.01	3.1	2,070.94	3.2

(Roland Portillo is an auditor with 14 years experience and has had his Color Computer for two years. His primary interest is programming for home money management.)

`CHR$(12)` - Form Feed
`CHR$(15)` - Turns on Condensed Letters
`CHR$(18)` - Turns off Condensed Letters

Definition of Variables:

01A$ - Account and heading names
M - Monthly dollar amounts
MM - Monthly percent of each item
Y - Year-to-date amounts
YY - Year-to-date percent

Operation of the Program

The program is user-friendly. Just follow the instructions on the screen.

When using this program for the first time, you are asked if there are any cumulative year-to-date totals that need to be entered. Answering "None" will take you to the start of the data input routines.

Accounts

All the account names and group headings are in the data statements starting at Line 1040. Changes can be made easily to customize these items to meet your specific needs. One word

Federal income taxes	411.34	7.8	8,459.75	12.9
State income taxes	154.55	2.9	2,820.07	4.3
Retirement and deferred compensation	100.39	1.9	5,647.00	8.6
I.R.A.	0.00	0.0	2,566.35	3.9
Credit union loans	330.00	6.3	1,989.82	3.0
Total	1,161.29	22.1	23,553.93	36.0
Residential Expenses				
Mortgage payments	546.00	10.4	6,552.00	10.0
Property taxes	0.00	0.0	0.00	0.0
Insurance	0.00	0.0	524.10	0.8
Repairs and maintenance	86.45	1.6	1,267.89	1.9
Utilities:				
Telephone	50.79	1.0	347.82	0.5
Electricity	20.87	0.4	311.03	0.5
Gas	27.10	0.5	211.91	0.3
Water and disposal	22.71	0.4	154.29	0.2
Major improvements	40.46	0.8	335.97	0.5
Furnishing purchases	152.96	2.9	305.92	0.5
Total	947.34	18.0	10,010.93	15.3
Automobile Expenses				
Husband's car:				
Insurance	154.10	2.9	568.76	0.9
Repairs and maintenance	0.00	0.0	179.45	0.3

One-Liner Contest Winner . . .

In this space game, you maneuver your ship through an asteroid field to reach the base. If you hit an asteroid it turns blue; the goal is not to hit any.

The listing:

```
0 CLS0:FORX=1TO125:SET(RND(63),R
ND(31),5):NEXT:FORX=1TO4:READA,B
:PRINT@A,CHR$(B);:NEXT:DATA411,1
79,442,191,443,188,444,191:FORX=
1TO10000:RESET(H,V):H=JOYSTK(0):
V=JOYSTK(1):IFV>31THENV=31:SET(H
,V,3):NEXT:ELSESET(H,V,3):SOUNDH
+1,1:NEXT:PRINT"GAME OVER"
```

Garry Shelton
Kannapolis, NC

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape.*)

One-Liner Contest Winner . . .

Music Box is exactly that, a program that plays a single tune. The author decided that *somebody* had to write a music program to go with all those beautiful graphics!

The listing:

```
5 A$="O2L2CEGEO3CO2GEG":B$="O3L1
.CL2ECEGEO4CO3BAL1.GP4L2GFDO2BGB
O3D":C$="O4L2CO3AFCO2AO3CFAGCAL1
.GP4L2GFDO2BGBO3D":PLAY"T11XA$;X
A$;XB$;FECAL1.GP4XB$;O2BO3CO2GO3
EL1.CP4XC$;FECAL1.GP4XC$;O2BO3L1
..CP4":GOTO5
```

Bob Leiter
North Platte, NE

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape.*)

of caution here. If you do change the account names, be sure to keep the same number of accounts in each grouping, or the totals and percentages will be off.

A note about the sales tax calculation. In my state the rate is 6.5 percent. You will need to change Line 460 for your particular circumstances.

For quick reference to the numerous accounts, after typing in the program, run it up to where it says ENTER STATEMENT DATE:. At that point, hit the BREAK key, turn your printer on, and type in the following direct command:

```
FOR N=1 TO 71:PRINT#-2,N;A$(N):NEXT
```

Pressing ENTER will send the various account names with their corresponding numbers to the printer which will be verified when you enter your data into the program. You can then either type `CONT` or run the program from the beginning.

After all your data has been entered, you can enter `SUM` to see a summary of your figures, just to be certain that you haven't forgotten anything. When the screen freezes, hitting any key will always continue the program. If you are satisfied that all your data is accurate, simply type `END`.

You will be asked if these are the final figures for the month or whether more will be added at a later date. If you answer "No" to any additions, the program will calculate the data. Once again, before the statement is printed you can request a preview, to quickly see the final results on the screen.

A check will then be made to see if the printer is ready. If not, you will be asked to put it online before continuing the program.

A note about the printer check. If you keep your printer unplugged for any reason (mainly to use the outlet), then the routine will be effective. I use a power strip with an on/off switch, so if I forget to turn the power on to the printer, my data won't be sent to nowhere. Of course, if this should happen, simply hit the BREAK key, turn your printer on, type in `GOTO 600`, and press ENTER. This will take the program back to the beginning of the print routine without a loss of your data.

I hope you find a use for this program. I consider it to be one of my most useful. Hopefully, by finding where I'm spending too much money, I can save enough to buy more computer equipment.

Licenses and fines	0.00	0.0	68.00	0.1
Gasoline	67.51	1.3	665.88	1.0
Less reimbursements	0.00	0.0	-777.60	-1.2
Total	221.61	4.2	704.49	1.1
Automobile Expenses				
Wife's car:				
Insurance	0.00	0.0	163.38	0.2
Repairs and maintenance	62.20	1.2	570.73	0.9
Licenses and fines	12.00	0.2	54.00	0.1
Gasoline	99.20	1.9	1,252.64	1.9
Less reimbursements	-199.10	-3.8	-1,332.59	-2.0
Total	-25.70	-0.5	708.16	1.1
Total Automobile Expenses	195.91	3.7	1,412.65	2.2
Other Expenses				
Union dues	8.10	0.2	97.20	0.1
Life insurance	89.72	1.7	889.52	1.4
Health/Hospital insurance	26.26	0.5	188.51	0.3
Medical/Dental	9.25	0.2	418.46	0.6
Pet expenses	104.02	2.0	972.56	1.5
Meals out	209.02	4.0	2,585.35	3.9
Food purchases	78.79	1.5	1,775.29	2.7
Appliances, dishes, etc.	1.04	0.0	282.45	0.4
Small tools, etc.	4.22	0.1	306.22	0.5
Work related expenses	134.56	2.6	479.47	0.7
Computer expenses	82.27	1.6	809.16	1.2
Stereo/video/photo	-0.87	-0.0	3,324.22	5.1
Hobby expenses	0.00	0.0	98.11	0.1
Entertainment	102.50	1.9	550.92	0.8
Physical fitness expenses	26.71	0.5	1,001.14	1.5
Personal grooming and hygiene	43.98	0.8	674.97	1.0
Vacation	35.29	0.7	480.16	0.7
Clothing	373.27	7.1	2,324.52	3.6
Laundry and cleaning	0.00	0.0	29.46	0.0
Gifts, etc.	91.28	1.7	851.51	1.3
Flowers	0.00	0.0	30.31	0.0
Contributions	17.00	0.3	243.81	0.4
Magazines and books	0.00	0.0	97.07	0.1
Bank/finance charges	0.00	0.0	70.56	0.1
Collectibles	145.35	2.8	1,002.16	1.5
Miscellaneous	47.08	0.9	400.10	0.6
Total	1,628.84	31.0	19,983.21	30.5
Total Expenses	3,933.38	74.8	54,960.72	84.0
Change in Savings	1,328.50	25.2	10,504.73	16.0
---Sales tax paid---	94.09		1,045.88	

160	9	960	219
310	135	1070	121
460	6	1140	34
590	115	END	96
790	102		

The listing:

```
10 '****************************
20 '  HOME FINANCIAL STATEMENT
30 '            BY
40 '     ROLAND B. PORTILLO
50 '
60 '        VERSION 2.2
70 '         JULY, 1984
80 '****************************
90 '
100 CLS:PRINT@164,"HOME FINANCIA
L STATEMENT":FOR X=1TO1500:NEXT
110 VERIFYON:DIMA$(75),M(75),MM(
75),Y(75),YY(75)
120 X$="#######,.##":D$="$$#####
,.##":K$="###.#"
130 CLS:PRINT@130,"ARE THERE ANY
 MIDMONTH TOTALS":PRINT@170,"TO
ENTER:":PRINTTAB(15)"";: :LINEIN
PUTR$:IFR$="Y" OR R$="YES" THEN
GOSUB 1210
140 CLS:PRINT@132,"To Enter CUMU
LATIVE TOTALS":PRINT@170,"press
<<ENTER>>":PRINT@256,"If no prio
r totals, enter 'NONE'"
150 PRINT@398,"";:LINEINPUTR$:IF
R$="NONE"THEN190
160 OPEN"I",#1,"BUDGET"
170 FORN=1TO75
180 INPUT#1,Y(N):NEXT:CLOSE#1
190 FORN=1TO75:READA$(N):NEXT
200 CLS:PRINT@135,"ENTER STATEME
NT DATE:":PRINT@171,"";:LINEINPU
TM$:IF M$="" THEN 200
210 CLS:PRINT@32,"Enter 'END','S
UM' or budget code":PRINT@64,STR
ING$(32,"-"):PRINT@174,"";:LINEI
NPUTBC$:IFBC$="END"THEN300ELSEIF
BC$="SUM"THENGOSUB1160:GOTO210
220 IFBC$=""THEN240
230 A=VAL(BC$)
240 IFA>30ANDA<36THENPRINT@169,"
HUSBAND'S CAR:"ELSEIFA>37ANDA<43
THENPRINT@169,"WIFE'S CAR:"
250 IFA=20THENPRINT@263,A$(16)
260 IFA>71ORA<2ORA=21ORA=7ORA=8O
RA=15ORA=16ORA=28ORA=29ORA=30ORA
=36ORA=37ORA=43ORA=44ORA=45THENS
OUND50,1:CLS:PRINT@170,"NO SUCH
ACCOUNT";:FORX=1TO500:NEXT:GOTO2
10
270 PRINT@202,A$(A):PRINT:IFA=35
ORA=42THENPRINT"  Enter as a neg
ative amount"
280 PRINT:LINEINPUT"     ENTER A
MOUNT:$ ";AM$
290 AM=VAL(AM$):M(A)=M(A)+AM:AM=
0:GOTO210
300 CLS:PRINT@164,"Will there be
 any additions before printing s
tatement? ";:LINEINPUTR$:IFR$="Y
"ORR$="YES"THENPRINT@352,"Enter
first 3 letters of month:":PRINT
TAB(12)"";:LINEINPUTZ$:GOTO1130
310 'to accumulate totals
320 FORN=2TO6:M(7)=M(7)+M(N):Y(N
)=Y(N)+M(N):NEXT:Y(7)=Y(7)+M(7)
330 FORN=9TO14:M(15)=M(15)+M(N):
Y(N)=Y(N)+M(N):NEXT:Y(15)=Y(15)+
M(15)
340 FORN=17TO27:M(28)=M(28)+M(N)
:Y(N)=Y(N)+M(N):NEXT:Y(28)=Y(28)
+M(28)
350 FORN=31TO35:M(36)=M(36)+M(N)
:Y(N)=Y(N)+M(N):NEXT:Y(36)=Y(36)
+M(36)
360 FORN=38TO42:M(43)=M(43)+M(N)
:Y(N)=Y(N)+M(N):NEXT:Y(43)=Y(43)
+M(43)
370 M(44)=M(36)+M(43):Y(44)=Y(36
)+Y(43)
380 FORN=46TO71:M(72)=M(72)+M(N)
:Y(N)=Y(N)+M(N):NEXT:Y(72)=Y(72)
+M(72)
390 M(73)=M(15)+M(28)+M(44)+M(72
):M(74)=M(7)-M(73):Y(73)=Y(73)+M
(73):Y(74)=Y(7)-Y(73)
400 'to calculate sales tax
410 FORN=53TO71:M(75)=M(75)+M(N)
:NEXT
420 M(75)=M(75)+M(20)+M(26)+M(27
)
430 M(75)=M(75)+(M(32)/2)+(M(39)
/2)
440 M(75)=M(75)+(.85*M(51))
450 M(75)=M(75)+M(50)-M(59)-M(62
)-M(64)-M(67)-M(69)
460 M(75)=M(75)-(M(75)/1.065):Y(
75)=Y(75)+M(75)
470 'to compute %
480 FORN=2TO6:MM(N)=M(N)/M(7):YY
(N)=Y(N)/Y(7):MM(7)=MM(7)+MM(N):
YY(7)=YY(7)+YY(N):NEXT
490 FORN=9TO14:MM(N)=M(N)/M(7):Y
Y(N)=Y(N)/Y(7):MM(15)=MM(15)+MM(
N):YY(15)=YY(15)+YY(N):NEXT
500 FORN=17TO27:MM(N)=M(N)/M(7):
YY(N)=Y(N)/Y(7):MM(28)=MM(28)+MM
(N):YY(28)=YY(28)+YY(N):NEXT
```

```
510 FORN=31TO35:MM(N)=M(N)/M(7):
YY(N)=Y(N)/Y(7):YY(36)=YY(36)+YY
(N):MM(36)=MM(36)+MM(N):NEXT
520 FORN=38TO42:MM(N)=M(N)/M(7):
YY(N)=Y(N)/Y(7):MM(43)=MM(43)+MM
(N):YY(43)=YY(43)+YY(N):NEXT
530 MM(44)=MM(36)+MM(43):YY(44)=
YY(36)+YY(43)
540 FORN=46TO71:MM(N)=M(N)/M(7):
YY(N)=Y(N)/Y(7):MM(72)=MM(72)+MM
(N):YY(72)=YY(72)+YY(N):NEXT
550 MM(73)=MM(15)+MM(28)+MM(44)+
MM(72):YY(73)=YY(15)+YY(28)+YY(4
4)+YY(72)
560 MM(74)=M(74)/M(7):YY(74)=Y(7
4)/Y(7)
570 'to convert %
580 FORN=1TO75:MM(N)=MM(N)*100:Y
Y(N)=YY(N)*100:NEXT
590 CLS:PRINT@162,"DO YOU WANT A
 SCREEN PREVIEW? ";:EXEC44539:IF
INKEY$="Y"THENGOSUB1160
600 'check if printer is ready
610 IFPEEK(65314)/2=INT(PEEK(653
14)/2)THENI=1ELSEI=0
620 IFI=0THENCLS:PRINT@200,"PRIN
TER NOT READY":PRINT@420,"PRESS
ANY KEY WHEN READY":EXEC44539
630 CLS0:PRINT@236,"WORKING";
640 PRINT#-2,CHR$(14)"
 INCOME STATEMENT":PRINT#-2,TAB(
24)"FOR MONTH ENDING ";M$:PRINT#
-2
650 PRINT#-2,TAB(42)"MONTH"TAB(5
3)"%"TAB(62)"Y.T.D."TAB(74)"%"
660 PRINT#-2,TAB(6)A$(1)
670 N=2:GOSUB950
680 FORN=3TO7:GOSUB940:NEXT
690 PRINT#-2:PRINT#-2,TAB(6)A$(8
)
700 N=9:GOSUB950
710 FORN=10TO15:GOSUB940:NEXT
720 PRINT#-2:PRINT#-2,TAB(6)A$(1
6)
730 N=17:GOSUB950
740 FORN=18TO20:GOSUB940:NEXT
750 PRINT#-2,TAB(6)A$(21)
760 N=22:GOSUB950
770 FORN=23TO28:GOSUB940:NEXT
780 PRINT#-2:PRINT#-2,TAB(6)A$(2
9)
790 PRINT#-2,TAB(4)A$(30)
800 N=31:GOSUB950
810 FORN=32TO36:GOSUB940:NEXT
820 PRINT#-2:PRINT#-2,TAB(4)A$(3
7)
830 N=38:GOSUB950
840 FORN=39TO43:GOSUB940:NEXT
```

ARE YOUR WALKING FINGERS GETTING FOOTSORE?

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Sugar
Software

The CoCo Calligrapher

The CoCo Calligrapher works on these printers:

Epson: MX80, FX80, 100 (8 1/2 x 11 size only), and all models with graphtrax
Gemini: 10, 10X, 15, 15X (81/2 x 11 size only)
Radio Shack: LP7, LP8, DMP100, 110, 120, 200, 420, 510, 2100
Okidata: 92A - unless it is version 4. The ROM has a bug and the dealer should replace it for you.
Banana: Behaves like a Radio Shack
Prowriter: 8510

These type styles come on the CoCo Calligrapher program tape or disk:

Old English
Gay Nineties
Cartoon

Tape - $24.95
Disk - $29.95
Both require 32K ECB

These additional type styles are also available — **$19.95 each, or $49.95** for all on tape or disk.

Tape 1

Old English-reduced	Cartoon-reduced	Gay Nineties-reduced
Old English-reverse	Cartoon-reverse	Gay Nineties-reverse
Old English-reverse/reduced	Cartoon-reverse/reduced	Gay Nineties-reverse/reduced

Old English Cartoon Gay Nineties

Tape 2

Broadway
Broadway

Broadway
Broadway-reduced
Broadway-reverse
Broadway-reverse/reduced

Tape 3

Business
Business

Business
Business-reduced
Business-reverser
Business-reverse/reduced

Old Style
Old Style

Old Style
Old Style-reduced
Old Style-reverse
Old Style-reverse/reduced

Antique
Antique

Antique
Antique-reduced
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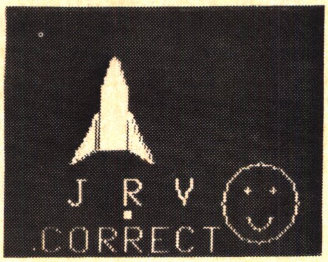

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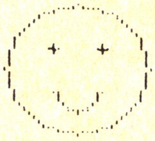

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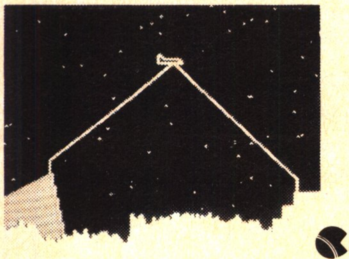

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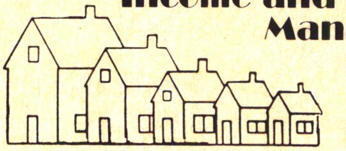

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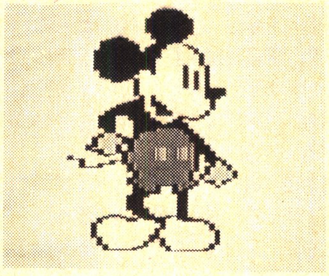

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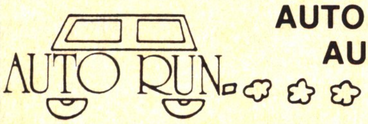

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```
850 PRINT#-2:N=44:GOSUB950:PRINT
#-2,CHR$(12)
860 PRINT#-2,TAB(27)"MONTH ENDIN
G ";M$:PRINT#-2
870 PRINT#-2,TAB(6)A$(45)
880 N=46:GOSUB950
890 FORN=47TO72:GOSUB940:NEXT
900 PRINT#-2:N=73:GOSUB950
910 PRINT#-2:N=74:GOSUB950
920 PRINT#-2:PRINT#-2,TAB(4)A$(7
5)TAB(37):PRINT#-2,USINGX$;M(75)
;:PRINT#-2,TAB(57)"";:PRINT#-2,U
SINGX$;Y(75)
930 PRINT#-2,CHR$(12):GOTO960
940 PRINT#-2,TAB(5)A$(N)TAB(38):
PRINT#-2,USINGX$;M(N);:PRINT#-2,
CHR$(15)TAB(56)"";:PRINT#-2,USIN
GK$;MM(N);:PRINT#-2,CHR$(18)TAB(
64)"";:PRINT#-2,USINGX$;Y(N);:PR
INT#-2,CHR$(15)TAB(84)"";:PRINT#
-2,USINGK$;YY(N):PRINT#-2,CHR$(1
8)"";:RETURN
950 PRINT#-2,TAB(4)A$(N)TAB(37):
PRINT#-2,USINGX$;M(N);:PRINT#-2,
CHR$(15)TAB(55)"";:PRINT#-2,USIN
GK$;MM(N);:PRINT#-2,CHR$(18)TAB(
63)"";:PRINT#-2,USINGX$;Y(N);:PR
INT#-2,CHR$(15)TAB(83)"";:PRINT#
-2,USINGK$;YY(N):PRINT#-2,CHR$(1
8)"";:RETURN
960 'to convert % back
970 FORN=1TO75:MM(N)=MM(N)/100:Y
Y(N)=YY(N)/100:NEXT
980 OPEN"O",#1,"BUDGET"
990 FORN=1TO75
1000 WRITE#1,Y(N):NEXT:CLOSE#1
1010 CLS:PRINT@65,"ENTER BACKUP
DISK FOR COPY AND":PRINTTAB(8)"
PRESS <ENTER>":EXEC44539:OPEN"O"
,#1,"BUDGET"
1020 FORN=1TO75
1030 WRITE#1,Y(N):NEXT:CLOSE#1:E
ND
1040 DATA "     SOURCES OF INCOME
:",Husband's salary,Wife's salar
y,Overtime,Interest earned,Misc.
 Income,"        TOTAL"
1050 DATA"    WITHHOLDINGS & PAY
MENTS:",F.I.C.A.,Federal Income
Taxes,State Income Taxes,Retirem
ent & Deferred Comp.,I.R.A.,Cred
it Union Loans,"        TOTAL"
1060 DATA "     RESIDENTIAL EXPEN
SES:",Mortgage Payments,Property
 Taxes,Insurance,Repairs & Maint
enance,"Utilities:","  Telephone
","  Electricity","  Gas","  Wat
er & Disposal"
1070 DATA Major Improvements,Fur
nishing Purchases,"        TOTAL",
"     AUTOMOBILE EXPENSES:","Husb
and's Car:","  Insurance","  Rep
airs & Maintenance","  Licenses
& Fines","  Gasoline","  Less Re
imbursements","        TOTAL"
1080 DATA  "Wife's Car:","  Insu
rance","  Repairs & Maintenance"
,"  Licenses & Fines","  Gasolin
e","  Less Reimbursements","
  TOTAL","      TOTAL AUTOMOBILE
 EXPENSES"
1090 DATA  "     OTHER EXPENSES:"
,Union Dues,Life Insurance,Healt
h/Hospital Insurance,Medical/Den
tal,Pet Expenses,Meals Out,Food
Purchases,"Appliances, Dishes, e
tc.",Small Tools etc.,Work Relat
ed Expenses
1100 DATA  Computer Expenses,Ste
reo/Video/Photo,Hobby Expenses,E
ntertainment,Physical Fitness Ex
penses,Personal Grooming & Hygie
ne,Vacation,Clothing,Laundry & C
leaning,Gifts etc.,Flowers
1110 DATA  Contributions,Magazin
es & Books,Bank/Finance charges,
Collectibles,Miscellaneous
1120 DATA "       TOTAL","      TOT
AL EXPENSES","  ***CHANGE IN SAV
INGS***","  ----SALES TAX PAID--
---"
1130 OPEN"O",#1,"MIDMONTH."+Z$:F
ORN=1TO75:WRITE#1,M(N):NEXT:CLOS
E#1
1140 PRINTTAB(10)"INSERT BACKUP
DISK AND PRESS":PRINT:PRINTTAB(1
5)" 'C' FOR COPY":PRINT:PRINTTAB
(15)"'ENTER' TO END"
1150 EXEC44539:IF INKEY$="C" THE
N 1130 ELSE END
1160 CLS:S$="SUMMARY OF ACTIVITY
 TO DATE":PRINTTAB(3)S$:PRINT
1170 FORN=1TO75:C=C+1:PRINTUSING
"%          %";A$(N);:PRINT"   ";
:PRINTUSING"####.##";M(N);:PRINT
"  ";:PRINTUSING"#####.##";Y(N)
1180 IFC=13THENC=0:EXEC44539:CLS
:PRINTTAB(3)S$:PRINT
1190 NEXTN
1200 IFN>75THENEXEC44539:C=0:RET
URN
1210 PRINT@261,"ENTER FIRST 3 LE
TTERS OF      MONTH:  ";:LINEINP
UTZ$:OPEN"I",#1,"MIDMONTH."+Z$:F
OR N=1 TO 75:INPUT#1,M(N):NEXT:C
LOSE#1:M(7)=0:M(15)=0:M(28)=0:M(
36)=0:M(43)=0:M(44)=0:M(72)=0:M(
73)=0:M(74)=0:M(75)=0:RETURN
```

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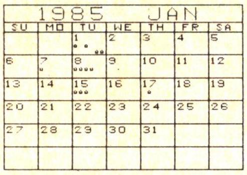

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SU	MO	TU	WE	TH	FR	SA
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

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1
43
+69
102
1+4+6=11

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Further Venturing With Program Tables

By Joseph Kolar
Rainbow Contributing Editor

You may just as well get last month's issue of THE RAINBOW and page to the "Taking BASIC Training" article.

Everyone is encouraged to save all back issues of THE RAINBOW. All beginners are urged to buy all available back issues that may have been missed. Each issue is equivalent to a good-sized text book and contains a wealth of information. All RAINBOW issues should become a valued part of your CoCo reference library.

As the beginner progresses through BASIC, he will find many new vistas opening up. Articles that were incomprehensible many moons ago will now have new significance. After all, the object of "Taking BASIC" is to whet the newcomer's appetite to partake of more complex programs and progress further to dine on "gourmet fare."

In reference to Listing 1, in last month's article (which you were asked to put on cassette tape), in program lines 130, 140 and 150 you could insert SEE, and change `GOTO 180` to `GOTO 200`. In lines 160 and 170, insert SEES, and change the `GOTO 190` to `GOTO 200`. Delete lines 180 and 190, and you will get the same result. It just proves there is more than one way to skin a cat.

(Joseph Kolar is a free-lance writer and programmer dedicated to proselytizing for computers in general, and the CoCo specifically.)

In effect, this makes columns 1 and 2 in Table 1 a new Column 1 and eliminates Column 2.

You may also desire to add more words to any column to get an even more varied assortment of sentences to study. For instance, change Line 110 to `X =RND(7)` and add at the end of Line 120: `,171,172`.

```
171 PRINT"       HE SEES ";:GOTO200
172 PRINT"      SHE SEES ";:GOTO200
```

If you enjoy experimenting, add a verb such as "hear" above the horizontal line of Table 1 and "hears" below the horizontal line (remember, we are still discussing last month's lesson).

Use the original listing or the modified one and figure out how to integrate the two verbs into the program. There are many ways to do it and it makes a neat puzzle to solve.

Listing 1 is the altered version of last month's listing. You may choose to `CLOAD` your saved copy, key in Listing 1 or merely follow this month's continuation.

Refer to Table 1; make a rough working copy of it. It is assumed you have mastered the program developed last month and understand how to use the table.

Notice the dividing horizontal lines in columns 1, 3 and 7. This means that in this particular group of random sentences, the pronouns in columns 3 and 7 agree with the masculine nouns. Conversely, the third person feminine pronouns agree with the feminine nouns. Even though both the "boys" and "girls" can call the present or past tense in Column 2, the verbs in columns 4 and 8 must be in the same tense as those in Column 2.

If you attempt to create sentences from this table without the above restrictions, you are apt to get foolish sentences such as: "Joe thought she knows Greek but he didn't." To create acceptable sentences, we have to turn to string variables.

To temporarily bypass the `CLOAD`ed listing, add:

```
10 GOTO 400
400 CLS:FOR I=1 TO 6:PRINT:NEXT
```

Program Line 400 clears the screen and locates our first line of created text on the sixth screen line.

The nouns in Column 1 and the pronouns in Column 3 will have to be turned into string variables.

```
410 B$="  JOE ":C$=  GEORGE ":D$="HE "
420 E$="  DIANA ":F$=  OLIMPIA ":G$="SHE "
```

Note that nouns have two spaces in front of the names for indentation purposes and one space after to allow for spacing between the noun and the next word. The two pronouns have only a space at the end for the same purpose.

The rule is that each word will allow for the spacing between it and the following word with space after the word, before adding the closing quotation mark. Now, for the three sets of verbs:

```
430 L$="THINKS ":M$="THOUGHT "
440 N$="KNOWS ":O$="KNEW "
450 P$="DOESN'T ":Q$=DIDN'T "
```

Using the `RND(x)` function, we may begin creating the four nouns in Column 1, by choosing and then printing the appropriate variable:

```
460 X=RND(4):ON X GOTO 470
470 PRINT B$;
480 PRINT C$;
490 PRINT E$;
500 PRINT F$;
510 GOTO 510
```

Line 510 is a convenient but temporary pause to allow us to check out work in progress. Run the listing. Depending on what value 'X' equals, you will be shocked to get from one to four names with three spaces between names. Can you guess why?

Since we want pronouns to agree with the gender (male or female), we must allow for them. Thus, Z$=D$ (he) only when a masculine noun is chosen by impartial CoCo. Z$=G$ (she) when a feminine noun is called. Add to both lines 470 and 480:

```
<:Z$=D$>
```

To lines 490 and 500 add:

```
<:Z$=G$>
```

Now, add to lines 470-500:

```
<:GOTO 510>
```

In Column 2, CoCo has a choice of two tenses. In Column 3, we have pronouns that must agree with nouns in Column 1. In Column 4, we have verbs that must agree in tense with those in Column 2. Key in:

```
510 X=RND(2): ON X GOTO 520,530
520 PRINTL$;Z$;:ZZ$=N$:PRINTZZ$;:GOTO540
530 PRINTM$;Z$;:ZZ$=O$:PRINTZZ$;
540 GOTO 540
```

Run repeatedly, checking for mistakes. Since the noun can call either tense, lines 520 and 530 give us the two verbs (L$ or M$). We allowed for the proper pronoun, Z$ (lines 470-500). We set up ZZ$ to equal either N$ or O$, and print the appropriate verb from Column 4 that agrees in tense with the verb in Column 2.

Note at this time that when a sentence begins with OLIMPIA, only five spaces remain at the right-hand margin. Obviously, the nouns in Column 5 will split into two text lines on the screen.

Set up the program line numbers for the Column 5 nouns by keying:

```
540 X=RND(4):ON X GOTO 550,560,570,580
```

We use `PRINT@` to locate the next text word on the second text line at the left margin.

```
550 PRINT@224,"RUMANIAN ";:GOTO 590
560 PRINT@224,"GREEK ";:GOTO590
570 PRINT@224,"LATIN ";:GOTO590
580 PRINT@224,"FRENCH ";
590 GOTO 590
```

Run repeatedly and weed out any errors. Rewrite Line 590 to read:

```
590 PRINT"BUT ";Z$;
```

The above line adds the only word in Column 6 and Z$ adds the correct pronoun from Column 7. (Recall that we told CoCo in lines 470-500 whether Z$= "he" or "she.")

```
600 GOTO 600
```

Run the program and check.

To get the correct tense we desire from Column 8, we tell CoCo:

```
600 IF ZZ$=N$ then AA$=P$
610 IF ZZ$=O$ then AA$=Q$
620 PRINT AA$
```

If ZZ$ is the present tense, then AA$ would be the present tense, etc.

At this point, it is time to center both text lines. Run repeatedly to check the length of the first line of text. The longest line of text is "Olimpia thought she knew." (You could also count the characters and spaces between words, using Table 1, to find out the number of spaces remaining at the right side.) It is always better to visually inspect your handiwork.

The longest line of text leaves five blank spaces on the right. This indicates it is safe to add three spaces in front of all initial sentence words in Column 1.

Edit lines 410 and 420. Insert three additional spaces between the first quotation mark and the first character of the noun in B$, C$, E$ and F$. Now, the first line of text will be pushed over toward the right; run this repeatedly. The first text line is fairly well-centered.

Looking at the second line, we note that rather than beginning at the left margin, it would look more attractive if we moved the line of text over two or three spaces; let's try three spaces. Edit lines 550-580. Change the value of 224 to 227 in each line and run.

You may not like this, so change 227 to 226 in lines 550-580 and run. Somehow, it looks better. You may still not like what you see, so try one space (225), and perhaps you prefer to begin at the left margin. You choose! Try them all and pick your preferred format.

To operate the program, we decide to press 'G' and to get out of the program, press 'H.' Key in:

```
630 A$=INKEYS:  IF A$="G" THEN CLS:GOTO400
640 IF A$="H" THEN CLS: GOTO 650 ELSE 630
```

To integrate last month's program, which we bypassed in order to develop this month's sentence, `DEL 10` and delete from Line 370 `ELSE 370` and add:

```
380 IF A$="H" THEN 400 ELSE 370
```

Note that 'H' will advance to the next group of sentences in Line 380 and in 640 will jump out of the program.

Make a closing panel.

```
650 CLS(3):PRINT@235," THE END ";
660 GOTO660
```

We must change the instructions at Line 50 (see Listing 2).

Naturally, you could add other tables to make this a long, varied and interesting study session for the pupil.

I hope you enjoyed creating this program. Remember, there are other ways to make portions of this program. Needless to say, you can add modifications and improvements; make up a nice title page of your own design.

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LOOK at these features:

Very easy to use • Top screen line reserved for HELP display/Command prompts • Excellent for BOTH program editing and word processing • TWO text entry modes; Insert or Exchange • Auto Key-Repeat • Smooth display scroll for easier proof reading • True Upper/Lower case display with lower case descenders • Hi-Res text "View" mode displays text exactly as it will be printed; including text Justification, Auto Line Centering, dynamic Margin changes, Top and Bottom Margins, Page Numbering, and Page Breaks • Include feature (disk only) permits including several file names within one output document; total document will have sequential page numbering if desired • Fast Disk I/O; no loading of overlay files to slow down operation • Variable Text (Mail Merge) capability for Form Letter generation included FREE!

32K Extended Basic Required for ROM routine calls • Variable TAB stops • User definable Headers and Footers • Smooth cursor movement over text; in any direction (including vertical) • Page Forward or Backward through text • Jump to beginning or end of text • Automatic text centering • Automatic text Word-Wrap if desired • True Block text Move, Delete, or Copy • Delete entire screen line • Backspace and Delete Character • Delete character above cursor • Find a string of characters • Global Replace character string • Two Hi-Res screen displays; 32 x 19 for text entry/editing, 64 x 19 for formatted text viewing • Continuous Memory display • Over 22K file size in 64K machines • Easy generation of ASCII files • Save/Load text files (in ASCII if desired) • Program remembers last File Name loaded or saved, and will write to it by default if desired • All I/O errors trapped and recoverable • Disk commands for Change Drive, Directory and Free Space • Print Format features allow user to specify Left Margin, Line Length, Line Spacing, Top and Bottom Margin, Duplicate Copies, Right-Side text Justification, Page Pause, Page Numbering, and more • Dynamically change any print Format features within text • Imbed Hex codes and printer Font changes within text.

Additional OS-9 version features:
Edit two files simultaneously • Save or Print only a portion of the text buffer • Edit files larger than memory (uses disk as buffer) • Block Copy from one file to another • Execute any OS-9 command from Editor

If you want powerful features AND a program that's EASY TO USE, Elite•Word is for you . . .

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>
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> *—A. Buddy Hogan, RAINBOW*

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Elite•Spel is an excellent spelling checker for your Color Computer, and its VERY FAST . . . that's the key. Why wait while a spelling checker does its job? Elite•Spel identifies all potentially misspelled words with a single pass through its perfectly adequate 24,000 word dictionary. Elite•Spel lets you Add or Delete Dictionary words EASILY. Elite•Spel is fully compatible with Elite•Word and will work with ASCII files from other programs.

MAJOR features include:
Easy to use, menu commands • Can learn 4,000 of your own words • List suspect words on screen or printer • Alphabetical listing of all words used with number of occurrences • Learn entire files of words • Can also "edit spelling in context" if desired • Works in single or multiple drive systems • 32K Disk required.

Radio Shack® Catalog #90-0185

Speed is the key . . . Elite•Spel has it!

***Available on Disk only* $29.95**

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Elite•Comm turns your Color Computer into a powerful 300 Baud terminal. With Elite•Comm you can access large main-frame computers, local computer bulletin boards, and national computer database services. Elite•Comm is fully compatible with Elite•Word and will work with ASCII files from other programs. If you want a terminal communications package that is smooth and easy to use, Elite•Comm is for you.

CHECK these program features:
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Elite•Comm is SMOOTH operation that's EASY TO USE!

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Elite•File™

THIS IS IT! ELITE•FILE is the Data Base Manager that Color Computer users have been waiting for. ELITE•FILE is for everyone who needs to store and retrieve information. ELITE•FILE is a full-featured relational Data Base Manager with all the editing and report formatting features that are typically found on much larger computer systems. COMPARE the others for record structure flexibility, total record capacity, information processing ability, speed of program response, printed output flexibility, and you'll agree that ELITE•FILE may very well be the most powerful/useful program ever written for the Color Computer.

No other File Manager gives you these features:
All machine language for speed • Flexible, user defined, data record structures • Up to 255 characters per record field • Up to 255 fields per record • Up to 2000 characters per record • Up to 4000 records per file • Up to 16 files can be open at the same time for information processing • Edit, Scan, Sort, Select Record information; all done FAST • Output reports to Screen, Printer, or ASCII Disk file • Place output data by Field Name, with Custom Text anywhere on the printed page • Perform math operations (+, –, *, /) between Field contents • Produce tabulated reports from multiple record contents • Generate column totals across record field contents.

Compatible with Elite•Calc and Elite•Word files • User friendly combination of Menu driven input, and single key commands • Supports up to 4 drives • Minimum 32K RAM, Disk required • Nested sub-field definitions • Up to 8 fields in Primary Key • Copy record definition from file to file • View/Print record definition • Input/Add records with easy to use field name format display • Edit records with full screen "type over" editor • Copy records to repeat identical data • Load Elite•Calc worksheets into random access data files • Scan mode for quick data retrieval • Locate any record by field contents • Select specific groups of records by field content with full logic combination capabilities • Sort records in ascending or descending order by any field, or group of fields • Calculate values from combinations of field contents • Output any subset of fields in any order for printed reports • User setable print formats; Page Title, Top and Bottom Margin, Line Spacing, Page Length, Page Pause, Form Feeds and more • Output format also supports TAB, VTAB, CR, PAGE, text, HEX printer controls, and more • Join up to four sub-files to extend data record for printing • Produce detailed repetitive reports, for output on preprinted forms, using output formats written on Elite•Word • Variable Text Insert feature of Elite•Word is fully supported • Refile old record data into NEW record structures • Data, Field Definitions, Indices all stored on a single file • Memory resident, no program overlays from disk • Single program performs all features • List disk Directories and "Kill" files without leaving the program • Data files also accessible from BASIC programs.

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ELITE•CALC was the first Color Computer spreadsheet program offering "major league" features. All the magazine reviewers loved it! Today, when you consider program performance speed, ease of use, price, and total features . . . ELITE•CALC is still your best choice.

MAJOR features include:
Very EASY to use • FAST Sorting • Printed Output, Screen Re-write, and Calculations all done FAST • Full cell-edit capability • Powerful cell-format options • Individual cell formulas • FREE sample worksheets • CALC-LIST availability.

Single character commands • Help displays • 255 maximum rows • 255 maximum columns • Available memory always displayed • Rapid Entry modes for text and data • Selectable, automatic, cursor movement • Insert, Delete, Move entire rows or columns • Replicate one cell to fill a row or column with selectable formula adjustment • All machine language for speed • Extended BASIC required for ROM routine calls • Automatic memory size detection for 16K, 32K, or 64K • >20K bytes storage available in 32K systems • Math operators: +, –, x, /, ↑, (,) • Relation operators: =, >, <, <=, >=, <> • Logic Operations: AND, OR, NOT • Conditional Formula: IF, THEN, ELSE • Trig Functions: SIN, COS, TAN, ATN • Log Functions: LOG, EXP, SQR • Misc. Functions: INT, FX, ABS, SGN, RND • Range Functions: SUM, AVERAGE, COUNT, MIN, MAX, LOOKUP • Definable constant table • User definable printer set-up commands • Individual column width settings • Adjustable row height to insert blank lines without wasting memory • Hide columns or rows • Alternate print font selectable on a cell by cell basis • Display/Print formats set by cell, row, or column • Dollar format, comma grouping, prefix or postfix sign • Scientific notation, fixed point and interger formats • Left and Right cell contents justification • Full page formatting • All formats stored with worksheet on disk (tape) • Save/Load Disk (tape) files in compact memory form • Scan disk directories • Output ASCII file for word processor input capability • Memory resident code . . . no repeated disk calls.

CALC-LIST is a separate, machine language, utility that works independently of Elite•Calc. It can read either tape or disk worksheet files, and will give you additional information that was previously "hidden" within your worksheet. With CALC-LIST, you can list on the screen (or print) the actual contents of your worksheet cells, including FORMULAS. You get all the valuable worksheet format data including assigned Column Widths, all cell Format specifications ($, C, I, F#, G, etc.), Constant table assignments, and Printer Format information (Set-up, Page Length, Line Width, etc.). Use your CALC-LIST printout as a hardcopy backup of your worksheet for review or archival purposes. You can even let your friends use the listing so they can type your worksheets.

Elite·Calc TAPE
RS catalog #90-0187

Elite·Calc DISK
RS catalog #90-0188

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"Elite•Calc is a great spreadsheet program! This professional quality program has the performance required for serious home applications as well as small businesses."
—Stuart Hawkinson, RAINBOW

"Truly one of the best programs I have seen."
—John Steiner, MICRO

"Elite•Calc is an extremely powerful worksheet . . ."
—Jack Lane, COLOR MICRO JOURNAL

"Bruce Cook's Elite•Calc is a very fine program indeed; potentially one of the great Color Computer Programs." ". . . a very impressive product."
—Scott L. Norman, HOT COCO

Listing 3 creates the routines for the sentences created in Line 400, using `GOSUB`s instead of `GOTO`s. If you care to explore, alter the second sentence program you developed using Listing 3 as a guide, to use `GOSUB`s instead of `GOTO`s. It is always good to know alternate solutions and the only real way to learn them is to experiment on the old CoCo.

1	2	3	4	5	6	7	8
JOE				RUMANIAN			
GEORGE	THINKS	HE	KNOWS	GREEK	BUT	HE	DOESN'T.
DIANA	THOUGHT	SHE	KNEW	LATIN		SHE	DIDN'T.
OLIMPIA				FRENCH			

Table X

Listing 1:

```
0 'LISTING1 MODIFIED FROM FEB.'8
5 'RAINBOW'
50 CLS(0): PRINT@128,"  TO STUDY
 THE SENTENCES IN THISPROGRAM, P
RESS THE <G> KEY.  RE-PEAT THIS
PROCEDURE UNTIL YOU   ARE FINISH
ED WITH THE TABLE."
60 PRINT:INPUT "           PRESS
<ENTER>";OA
100 CLS
105 FOR I=1 TO 6:PRINT:NEXT
110 X=RND(7)
120 ON X GOTO130,140,150,160,170
,171,172
130 PRINT"      I SEE ";:GOTO200
140 PRINT"      WE SEE ";:GOTO20
0
150 PRINT"     YOU SEE ";:GOTO20
0
160 PRINT"     JOE SEES ";:GOTO2
00
170 PRINT"   OLIMPIA SEES ";:GOT
O200
171 PRINT"      HE SEES ";:GOTO2
00
172 PRINT"     SHE SEES ";:GOTO2
00
200 X=RND(5):ON X GOTO210,220,23
0,240,250
210 PRINT"HIM ";:GOTO260
220 PRINT"HER ";:GOTO260
230 PRINT"THEM ";:GOTO260
240 PRINT"GEORGE ";:GOTO260
250 PRINT"DIANA ";:GOTO260
260 X=RND(2):ON X GOTO270,280
270 PRINT"OPENING":GOTO290
280 PRINT"SHUTTING":GOTO290
290 X=RND(2):ON X GOTO 300,310
300 PRINT@225,"A ";:GOTO320
310 PRINT@224," THE ";:GOTO320
320 X=RND(4): ON X GOTO330, 340,
350,360
330 PRINT"DOOR.":GOTO370
340 PRINT"WINDOW.":GOTO370
350 PRINT"BOOK.":GOTO370
360 PRINT"DICTIONARY.":GOTO370
370 A$=INKEY$: IF A$="G" THEN CL
S:GOTO100 ELSE370
```

250 5
500 26
END 245

Listing 2:

```
0 'LISTING2
50 CLS(0): PRINT@128,"  TO STUDY
 THE SENTENCES IN EACHTABLE, PRE
SS <G>.  WHEN YOU ARE READY TO G
O TO THE NEXT TABLE,  PLEASE PRE
SS <H>.  REPEAT THIS  PROCEDURE
UNTIL YOU FINISH ALL  THE TABLES
 IN THE EXERCISE."
60 PRINT:INPUT "           PRESS
<ENTER>";OA
100 CLS
105 FOR I=1 TO 6:PRINT:NEXT
110 X=RND(5)
120 ON X GOTO130,140,150,160,170
130 PRINT"      I ";:GOTO180
140 PRINT"     WE ";:GOTO180
150 PRINT"    YOU ";:GOTO180
160 PRINT"    JOE ";:GOTO190
170 PRINT"  OLIMPIA ";:GOTO190
180 PRINT"SEE ";:GOTO200
190 PRINT"SEES ";:GOTO200
200 X=RND(5):ON X GOTO210,220,23
0,240,250
210 PRINT"HIM ";:GOTO260
220 PRINT"HER ";:GOTO260
230 PRINT"THEM ";:GOTO260
240 PRINT"GEORGE ";:GOTO260
250 PRINT"DIANA ";:GOTO260
260 X=RND(2):ON X GOTO270,280
270 PRINT"OPENING":GOTO290
280 PRINT"SHUTTING":GOTO290
290 X=RND(2):ON X GOTO 300,310
300 PRINT@225,"A ";:GOTO320
310 PRINT@224," THE ";:GOTO320
320 X=RND(4): ON X GOTO330, 340,
350,360
```

```
330 PRINT"DOOR.":GOTO370
340 PRINT"WINDOW.":GOTO370
350 PRINT"BOOK.":GOTO370
360 PRINT"DICTIONARY.":GOTO370
370 A$=INKEY$: IF A$="G" THEN CL
S:GOTO100
380 IF A$="H" THEN 400 ELSE 370
400 CLS:FOR I=1 TO 6:PRINT:NEXT
410 B$="    JOE ":C$="    GEORGE
 ":D$="HE "
420 E$="    DIANA ":F$="    OLIM
PIA ":G$="SHE "
430 L$="THINKS ":M$="THOUGHT "
440 N$="KNOWS ":O$="KNEW "
450 P$="DOESN'T. ":Q$="DIDN'T. "
460 X=RND(4): ON X GOTO470,480,4
90,500
470 PRINT B$;:Z$=D$:GOTO510
480 PRINT C$;:Z$=D$:GOTO510
490 PRINT E$;:Z$=G$:GOTO510
500 PRINT F$;:Z$=G$:GOTO510
510 X=RND(2):ON X GOTO520,530
520 PRINTL$;Z$;:ZZ$=N$:PRINTZZ$;
:GOTO540
530 PRINTM$;Z$;:ZZ$=O$:PRINTZZ$;
540 X=RND(4):ON X GOTO550,560,57
0,580
550 PRINT@226,"RUMANIAN ";:GOTO5
90
560 PRINT@226,"GREEK ";:GOTO590
570 PRINT@226,"LATIN ";:GOTO590
580 PRINT@226,"FRENCH ";
590 PRINT"BUT ";Z$;
600 IF ZZ$=N$ THEN AA$=P$
610 IF ZZ$=O$ THEN AA$=Q$
620 PRINTAA$
630 A$=INKEY$:IF A$="G" THEN GOT
O400
640 IF A$="H" THEN CLS:GOTO650 E
LSE 630
650 CLS(3):PRINT@235," THE END "
;
660 GOTO 660
```

Listing 3:

```
0 'LISTING3***ANOTHER WAY TO
MAKE THE SENTENCES (LINES400- IN
LISTING2 USING GOSUB'S INSTEAD
OF GOTO'S.
100 CLS:FOR I=1 TO 6:PRINT:NEXT
110 B$="     JOE ":C$="     GEOR
GE ":D$="HE "
120 E$="     DIANA ":F$="     OL
IMPIA ":G$="SHE "
130 L$="THINKS ":M$="THOUGHT "
140 N$="KNOWS":O$="KNEW"
150 P$="DOESN'T.":Q$="DIDN'T."
160 GOSUB2000:GOSUB2100:GOSUB220
0
170 PRINT"BUT ";Z$;
180 IF ZZ$=N$ THEN AA$=P$
190 IF ZZ$=O$ THEN AA$=Q$
200 PRINTAA$
210 A$=INKEY$:IF A$="G" GOTO 100
 ELSE 210
2000 X=RND(4):ON X GOTO2010,2020
,2030,2040
2010 PRINTB$;:Z$=D$:RETURN
2020 PRINTC$;:Z$=D$:RETURN
2030 PRINTE$;:Z$=G$:RETURN
2040 PRINTF$;:Z$=G$:RETURN
2100 X=RND(2): ON X GOTO2110,212
0
2110 PRINTL$;Z$;:ZZ$=N$:PRINTZZ$
:RETURN
2120 PRINTM$;Z$;:ZZ$=O$:PRINTZZ$
```

Qu'Appelle?

There is an old legend, handed down through generations of Canadian plains Indians, which tells a tragic tale of two lovers.

A young Indian brave, so the legend goes, was on his way to his wedding, a journey of many days. He was making his way down a beautiful river valley, interspersed with many lakes, when he heard his name called. The caller seemed to be his lover. But that couldn't be. She was still days away.

"Who calls?" he asked from his drifting canoe.

"Who calls?" was his only answer -- a lonely echo; nothing more.

Yet, he was so sure...

When, finally, he arrived at his beloved's home, he was greeted with tears of sorrow and told the tale of his lover's illness and untimely passing. And as she crossed from this world into the next, he was told, with her last breath she called his name.

She had died the very moment he had heard her call his name while he made his way toward her -- down the Qu'Appelle Valley.

Qu'Appelle is French for "Who calls" and was the name given to the river and valley which pass through the plains of Saskatchewan in the heart of Canada.

Now, from the shore of Echo Lake in the beautiful Qu'Appelle Valley a call is going out again. This time it is to CoCo users everywhere.

A new (and different) news magazine, made especially for your CoCo and you, is about to be launched — from the shore of Echo Lake in the beautiful Qu'Appelle Valley, from the heart of Canada to you.

Watch for it!

Pieter van der Breggen,
Proprietor, Dragonfly Writings©.

```
:RETURN
2200 X=RND(4): ON X GOTO2210,222
0,2230,2240
2210 PRINT@226,"RUMANIAN ";:RETU
RN
2220 PRINT@226,"GREEK ";:RETURN
2230 PRINT@226,"LATIN ";:RETURN
2240 PRINT@226,"FRENCH ";:RETURN
```

Bonus Listing:

```
0 '<STARSONG>
10 '(C) 1984, J. KOLAR
30 PMODE2:PCLS:PMODE4
40 A=170:B=106:P=1.01
50 DIM B(2), D(2), F(2), H(2), J
(2)
61 DRAW"BM14,0D4"
63 DRAW"BM38,4L4"
65 DRAW"BM54,8U4"
67 DRAW"BM70,4R4"
69 DRAW"BM90,0F2ND4R4NE2D4NF2L4N
G2BEU2R2D2L2"
71 GET(10,0)-(18,8),B,G
73 GET(30,0)-(38,8),D,G
75 GET(50,0)-(58,8),F,G
77 GET(70,0)-(78,8),H,G
79 GET(90,0)-(98,9),J,G
90 PCLS:SCREEN1,1
105 FOR R=80 TO 20STEP-10
110 FOR Z=2000 TO 1904 STEP-5:C=
Z+Z/2
120 C=C+P^2/180
200 X=INT(A-6+R*SIN(C-.625)):Y=I
NT(B-6+R*COS(C-.625))
225 PUT(X-40,Y-10)-(X-32,Y-2),B,
NOT
230 PUT(X-40,Y-10)-(X-32,Y-2),D,
NOT
235 PUT(X-40,Y-10)-(X-32,Y-2),F,
AND
240 PUT(X-40,Y-10)-(X-32,Y-2),H,
AND
242 PUT(X-40,Y-10)-(X-32,Y-2),J,
PSET:SOUND45,1:NEXTZ,R
253 FOR S=1TO2:FOR Q=1 TO 5:PUT(
124,90)-(132,98),J,PRESET:FORT=1
TO50:NEXT
254 PUT(124,90)-(132,98),J,PSET
256 SOUND10,2:SOUND100,1:NEXTQ
257 FORQ=1TO300:NEXT:PLAY"V20L4E
EL8FAFAL16AO3CEECO2FAL32FL16AEDL
4CO1BO2CP4V15O2DEGL8GEL16GL8DCEE
FFL16GAGL8FEEL2CP4V20L4EEFFAAL16
BDL8O3CECEEDCO2BDL4CO1BL8O2CL2C"
259 NEXT S
260 GOTO 260
```

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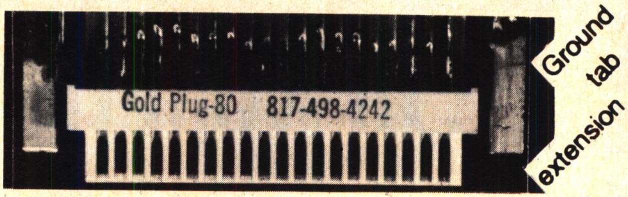

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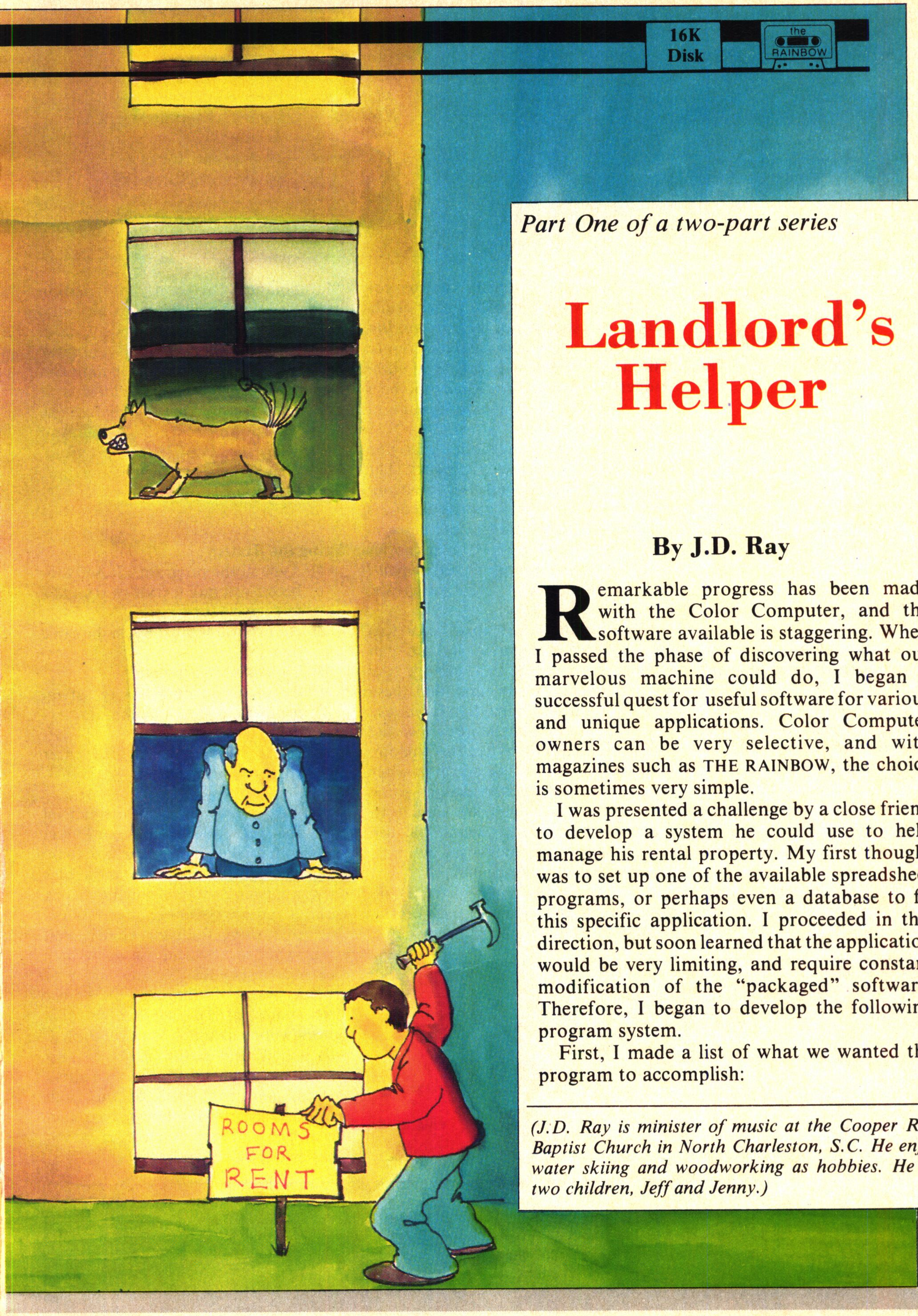


16K
Disk

Part One of a two-part series

Landlord's Helper

By J.D. Ray

Remarkable progress has been made with the Color Computer, and the software available is staggering. When I passed the phase of discovering what our marvelous machine could do, I began a successful quest for useful software for various and unique applications. Color Computer owners can be very selective, and with magazines such as THE RAINBOW, the choice is sometimes very simple.

I was presented a challenge by a close friend to develop a system he could use to help manage his rental property. My first thought was to set up one of the available spreadsheet programs, or perhaps even a database to fit this specific application. I proceeded in this direction, but soon learned that the application would be very limiting, and require constant modification of the "packaged" software. Therefore, I began to develop the following program system.

First, I made a list of what we wanted the program to accomplish:

(J.D. Ray is minister of music at the Cooper River Baptist Church in North Charleston, S.C. He enjoys water skiing and woodworking as hobbies. He has two children, Jeff and Jenny.)

1) A file program to have pertinent information available when needed, such as renter's name, rental date, deposits, phone numbers and mortgage information.
2) A financial journal to record all financial transactions each month.
3) A financial summary of income and expenses on a monthly basis.
4) A financial summary of individual property transactions on a monthly basis.
5) A year-to-date summary on income and expenses.
6) Applicable on a 16K Disk System with printer options.
7) Sufficient screen prompts to prevent keeping paper notes and instructions.

Display 1

Listing	Program	Size	Purpose
1	RENTMENU	636 bytes	System Manager
2	RENTMANG	5838 bytes	Property Information
3	FILEMAIN	4348 bytes	Codes, Income/Expense Accounts
4	TRANSACT	3787 bytes	Transaction Journal
5	INCOEXP	6811 bytes	Statements/Summaries

(Note: Listing 4 and 5 will be in next month's issue.)

We soon discovered that one program would be too cumbersome and too large for even a 32K system. I developed the system using four different programs to perform the various functions. A menu program coordinates the entire system.

Program Summary

RENTMENU sets up the basic foundation of the system and allows you to enter any special commands that will be needed for the other programs. Since graphics are not needed, a `PCLEAR1` is added to take advantage of all available memory. This will be especially important to 16K users. You can also insert commands to alter your printer Baud rate. Once the Baud rate is set in the menu program, you do not have to set it again in the other four programs.

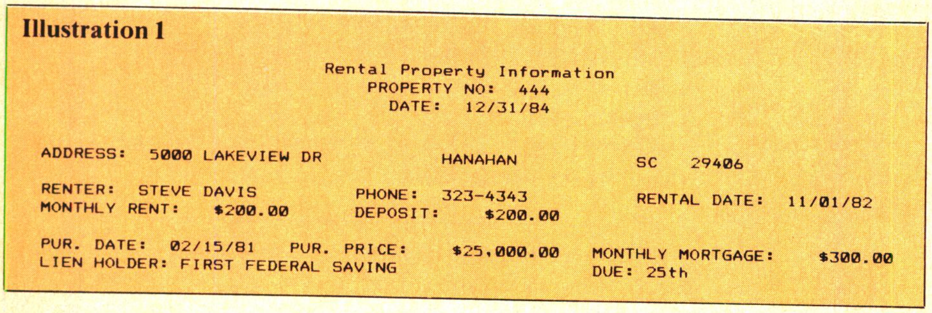
FILEMAIN is a file maintenance program and allows you to set up the programs for your own needs. This program needs to be run first so you can set up your accounts. Once established, you should not have to run this program except to change the accounts. The first menu will let you enter property codes (a three-digit number/letter combination), income accounts or expense accounts.

Property codes are codes that you assign to your various properties. The codes can be set up by location, acquisition or value. Expense accounts are those expense categories that you determine will be used. Use categories such as maintenance, advertisement, utilities, mortgage or loan payments, etc.

I advise you to set up at least two miscellaneous categories so you can expand later. You can change the account names at any time, and these will be reflected immediately in the program. However, the previous file summaries will not reflect this update. Be careful when adding accounts after the program has been in use for some time. Income accounts are similar to expense accounts and you should use such categories as rent income, refunds, deposits and miscellaneous.

RENT MANAGEMENT is a file program set up to keep records on the properties that you listed in the File Maintenance Program. Information requested will be such things as rental date, phone number, deposit paid, monthly rent, purchase date, purchase price, monthly mortgage, due date and lien holder. These can be changed at any time, but be sure to change the property code, renter's name and address in the *FILEMAIN* program. Other items can be changed at any time. See Illustration 1.

Illustration 1



```
                    Rental Property Information
                        PROPERTY NO:  444
                         DATE:  12/31/84

ADDRESS:  5000 LAKEVIEW DR                 HANAHAN            SC    29406

RENTER:  STEVE DAVIS             PHONE:  323-4343          RENTAL DATE:   11/01/82
MONTHLY RENT:    $200.00         DEPOSIT:        $200.00

PUR. DATE:  02/15/81    PUR. PRICE:      $25,000.00    MONTHLY MORTGAGE:       $300.00
LIEN HOLDER: FIRST FEDERAL SAVING                      DUE: 25th
```

Using the System

1) Type in the program carefully, or better yet, buy RAINBOW ON TAPE and save your fingers.
2) All programs must be on the same disk.
3) Type `RUN"RENTMENU"`
4) Select Menu option 4 to set up property codes, income and expense accounts.
5) Select Menu option 1 to enter property information.

Next month we will add the financial programs and discuss the use of Direct and Sequential disk files. Because these programs are set up to use disk files only, a cassette system will not work without radical system changes. While you are waiting for next month, you might want to brush up on using disk files by reading Bill Nolan's series of articles found in the July-December 1984 issues of THE RAINBOW. This system will be available on disk for $10 plus a disk and return postage. This system has been set up for two drive systems and for some of the high resolution screens. If interested, contact me at 5065 France Avenue in North Charleston, SC 29406.

Listing 1:

```
10 '***** RENT MENU *****
20 'LISTING #1
30 'COPYRIGHT- J.D. RAY
40 PCLEAR1
50 CC=163:DD=200:FOR XX=1TO6
```

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```
60 CLS6
70 PRINT@CC,"RENTAL PROPERTY MAN
AGEMENT";
80 PRINT@DD,"(C) BY J. D. RAY";
90 CC=CC-32
100 FOR Z=1TO250:NEXTZ
110 NEXTXX
120 'INSERT PRINTER BAUD RATE
130 PRINT@107,"MAIN MENU:";
140 PRINT@162,"1) PROPERTY INFOR
MATION";
150 PRINT@194,"2) LIST MONTHLY T
RANSACTIONS";
160 PRINT@226,"3) INCOME/EXPENSE
 SUMMARY";
170 PRINT@258,"4) SET-UP ACCOUNT
S";
180 PRINT@290,"5) END JOB";
190 PRINT@390,"(1, 2, 3, 4, OR 5
)";
200 AN$=INKEY$
210 IF AN$=""THEN200
220 ON VAL(AN$) GOSUB240,250,260
,270,280
230 GOTO 130
240 RUN"RENTMANG"
250 RUN"TRANSACT"
260 RUN"INCOEXP"
270 RUN"FILEMAIN"
280 POKE113,0:EXEC40999
```

```
 36 .......218
110 ......149
230 ......162
300 ......118
374 ......238
END .....174
```

Listing 2:

```
2 '***RENTMANG***
4 '**PROPERTY INFORMATION**
6 'LISTING #2
8 CC=163:FOR XX=1 TO 6
10 CLS:PRINT@CC,"RENTAL PROPERTY
 INFORMATION"
12 CC=CC-32
14 FOR Z=1TO250:NEXTZ
16 NEXTXX
18 CLEAR1000:DIM MTH$(12)
20 FOR ZZ=1 TO 12:READ MTH$(ZZ):
NEXTZZ
22 DATA JANUARY,FEBRUARY, MARCH,
 APRIL, MAY, JUNE, JULY, AUGU
ST,SEPTEMBER,OCTOBER,NOVEMBER,DE
CEMBER
24 K$="$##,###.##":K1$="$$###,##
#.##":KK$="$$####.##"
26 X=0
28 OPEN"I",#1,"PROPERTY/ACC"
30 IF EOF(1)=-1 THEN CLOSE#1:GOT
040
32 X=X+1
34 INPUT#1,COD$(X),ADR$(X),NAM$(
X)
36 GOTO30
38 CLOSE#1
40 IF X=0 THEN CLS:PRINT:PRINT"Y
OU NEED TO INPUT PROPERTY        I
NFORMATION FIRST!"
42 CLS:PRINT@98,"RENTAL PROPERTY
 INFORMATION"
44 PRINT@162,"1) INPUT DATA"
46 PRINT@194,"2) VIEW DATA"
48 PRINT@226,"3) PRINT DATA":PRI
NT@258,"4) END THIS JOB"
50 PRINT@322,"(1, 2, 3, OR 4)"
52 AN$=INKEY$:IF AN$=""THEN52
54 ON VAL(AN$) GOSUB 56,156,352,
408
56 'SUBROUTINE TO INPUT DATA ON
DISK
58 CLS:FORJJ=1TO5:PRINT:NEXT:PRI
NT" ENTER TODAY'S DATE: (MM/DD/Y
Y)"
60 PRINT:INPUT"   ";U$
62 GOSUB410
64 REC = LOF(1)
66 REC = REC+1
68 CLS:PRINT @3,"RENTAL PROPERTY
 INFORMATION"
70 PRINT
72 P$=COD$(REC):PRINT"PROPERTY N
O. CODE: ";P$
74 A$=ADR$(REC):PRINT"ADDRESS: "
;A$
76 INPUT"CITY: ";C$
78 INPUT"STATE (XX): ";S$
80 INPUT"ZIP CODE (XXXXX): ";Z$
82 N$=NAM$(REC):PRINT"RENTER NAM
E: ";N$
84 INPUT"RENTAL DATE (MM/DD/YY):
 ";R$
86 INPUT"PHONE (XXX-XXXX): ";H$
88 INPUT"DEPOSIT PAID: ";D(REC)
90 INPUT"MONTHLY RENT: ";M(REC)
92 INPUT"PUR DATE (MM/DD/YY):";E
$
94 INPUT"PURCHASE PRICE: ";PRI(R
EC)
96 INPUT"MONTHLY MORT.: $";Q(REC
)
98 INPUT"LIEN HOLDER: ";LN$
100 INPUT"PAYMENT DUE: (XX) ";PY
$
102 LSET UDAT$=U$
104 LSET COD$=P$
```

```
106 LSET ADR$=A$
108 LSET CITY$=C$
110 LSET STAT$=S$
112 LSET ZIP$=Z$
114 LSET NAME$=N$
116 LSET RDAT$=R$
118 LSET PHON$=H$
120 LSET DEP$=MKN$(D(REC))
122 LSET MREN$=MKN$(M(REC))
124 LSET PUR$=E$
126 LSET PRIC$=MKN$(PRI(REC))
128 LSET MORT$=MKN$(Q(REC))
130 LSET LIEN$=LN$
132 LSET PAY$=PY$
134 PUT #1,REC
136 IF TAG$="YES"THEN184
138 IF REC=X THEN GOTO42
140 CLS:PRINT@162,"1) INPUT ANOT
HER FILE"
142 PRINT@194,"2) VIEW INFORMATI
ON"
144 PRINT@226,"3) CHANGE INFORMA
TION"
146 PRINT@258,"4) END THIS JOB"
148 PRINT@394,"(1, 2, 3, OR 4)"
150 AN$=INKEY$:IF AN$=""THEN150
152 ON VAL(AN$) GOSUB 66,156,230
,416
154 GOTO 140
156 'SUBROUTINE FOR VIEWING INFO
RMATION FILES
158 CLOSE#1
160 GOSUB 410
162 CLS:PRINT@160,"DO YOU WANT T
O SEE ALL FILES OR ONE PROPERTY
LOCATION? "
164 PRINT@224,"(aLL OR oNE)"
166 INPUT XX$
168 IF XX$="O"THEN PRINT:PRINT"W
HAT IS THE PROPERTY NO. (XXX): "
:INPUT MN$
170 FOR REC = 1 TO LOF(1)
172 GET #1,REC
174 PRI(REC)=CVN(PRIC$)
176 M(REC)=CVN(MREN$)
178 D(REC)=CVN(DEP$)
180 Q(REC)=CVN(MORT$)
182 IF XX$="O" AND COD$ <> MN$ T
HEN 224
184 CLS
186 TAG$="NO"
188 PRINT@2,"rental property inf
ormation"
190 PRINT:PRINT@64,"prop. #: ";C
OD$
192 PRINT@80,"date: ";UDAT$
194 PRINT@96,"address: ";ADR$
196 PRINT@137,CITY$;:PRINT@149,"
```

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```
, ";STAT$;" ";ZIP$
198 PRINT:PRINT@192,"renter: ";N
AME$
200 PRINT@224,"phone no.: ";PHON
$
202 PRINT@256,"rental date: ";RD
AT$
204 PRINT@288,"rent: $";M(REC);:
PRINT@302,"deposit: $";D(REC)
206 PRINT:PRINT@321,"purchase da
te: ";PUR$
208 PRINT@353,"purchase price: $
";PRI(REC)
210 PRINT@384,"monthly mort.: $"
;Q(REC);:PRINT"  due: ";PAY$;"th
"
212 PRINT@416,"lien holder: ";LI
EN$
214 PRINT@482,"PRESS nEXT, mENU,
 OR cHANGE";
216 ANS$=INKEY$
218 IF ANS$="N" THEN 224
220 IF ANS$="C"THEN 230
222 IF ANS$="M"THEN 226 ELSE 214
224 NEXT REC
226 CLOSE#1
228 GOTO 42
230 'SUBROUTINE TO CHANGE DATA
232 TAG$="YES"
234 CLS:PRINT@64,"PROPERTY NO.:
";COD$:GOSUB344
236 IF AT$="Y"THEN238ELSE240
238 INPUT"NEW PROPERTY NO.: ";P$
:GOTO242
240 P$=COD$
242 PRINT@64,"DATE: ";UDAT$:GOSU
B344
244 IF AT$="Y"THEN246ELSE248
246 INPUT"NEW DATE: ";U$:GOTO250
248 U$=UDAT$
250 PRINT@64,"ADDRESS: ";ADR$:GO
SUB344
252 IF AT$="Y"THEN254ELSE256
254 INPUT"NEW ADDRESS: ";A$:GOTO
258
256 A$=ADR$
258 PRINT@64,CITY$;" ";STAT$;" "
;ZIP$:GOSUB344
260 IF AT$="Y"THEN262ELSE264
262 INPUT"NEW CITY: ";C$:INPUT"N
EW STATE: ";S$:INPUT"NEW ZIP: ";
Z$:GOTO270
264 C$=CITY$
266 S$=STAT$
268 Z$=ZIP$
270 PRINT@64,"RENTER: ";NAME$:GO
SUB344
272 IF AT$="Y"THEN274ELSE276
274 INPUT"NEW RENTER: ";N$:GOTO2
78
276 N$=NAME$
278 PRINT@64,"PHONE NO.: ";PHON$
:GOSUB344
280 IF AT$="Y"THEN282ELSE284
282 INPUT"NEW PHONE NO.: ";H$:GO
TO286
284 H$=PHON$
286 PRINT@64,"RENTAL DATE: ";RDA
T$:GOSUB344
288 IF AT$="Y"THEN290ELSE292
290 INPUT"NEW RENTAL DATE: ";R$:
GOTO294
292 R$=RDAT$
294 PRINT@64,"MONTHLY RENT: ";M(
REC):GOSUB344
296 IF AT$="Y"THEN298ELSE300
298 INPUT"NEW MONTHLY RENT: ";M(
REC):GOTO300
300 PRINT@64,"DEPOSIT: ";D(REC):
GOSUB344
302 IF AT$="Y"THEN304ELSE306
304 INPUT"NEW DEPOSIT: ";D(REC):
GOTO306
306 PRINT@64,"PURCHASE DATE: ";P
UR$:GOSUB344
308 IF AT$="Y"THEN310ELSE312
310 INPUT"NEW PURCHASE DATE: ";E
$:GOTO314
312 E$=PUR$
314 PRINT@64,"PURCHASE PRICE: ";
PRI(REC):GOSUB344
316 IF AT$="Y"THEN 318ELSE320
318 INPUT"NEW PURCHASE PRICE: ";
PRI(REC)
320 PRINT@64,"MONTHLY MORTGAGE:
";Q(REC):GOSUB344
322 IF AT$="Y"THEN324ELSE326
324 INPUT"NEW MORTGAGE: ";Q(REC)
:GOTO326
326 PRINT@64,"LIEN HOLD:";LIEN$:
GOSUB344
328 IF AT$="Y"THEN330ELSE332
330 INPUT"NEW LIEN HOLDER: ";LN$
:GOTO334
332 LN$=LIEN$
334 PRINT@64,"DATE DUE: ";PAY$:G
OSUB344
336 IF AT$="Y"THEN338ELSE340
338 INPUT"NEW DUE DATE: ";PY$:GO
TO342
340 PY$=PAY$
342 GOTO102
344 PRINT:PRINT:PRINT"CHANGE? (Y
/N)"
346 AT$=INKEY$:IF AT$=""THEN346
348 PRINT
350 RETURN
352 'SUBROUTINE TO PRINT INFORMA
```

```
TION
354 GOSUB410
356 CLS:PRINT@160,"DO YOU WANT T
O PRINT ALL FILE OR JUST ONE PRO
PERTY LOCATION? ":PRINT@224,"(AL
L OR ONE)"
358 INPUT XX$
360 IF XX$="O"THEN PRINT:PRINT"W
HAT IS THE PROPERTY NO. (XXX): "
:INPUT MN$
362 FOR REC=1 TO LOF(1)
364 GET #1,REC
366 PRI(REC)=CVN(PRIC$)
368 M(REC)=CVN(MREN$)
370 D(REC)=CVN(DEP$)
372 Q(REC)=CVN(MORT$)
374 IF XX$="O" AND COD$ <> MN$ T
HEN 402
376 FORX=1TO3:PRINT#-2:NEXTX
378 PRINT#-2,TAB(26);"Rental Pro
perty Information"
380 PRINT#-2,TAB(30);"PROPERTY N
O:  ";COD$
382 PRINT#-2,TAB(32);"DATE:  ";U
DAT$
384 PRINT#-2:PRINT#-2
386 PRINT#-2,"ADDRESS:  ";ADR$;"
      ";CITY$;",  ";STAT$;"    "
;ZIP$
388 PRINT#-2
390 PRINT#-2,"RENTER:  ";NAME$;T
AB(8);"PHONE:  ";PHON$;"
  ";"RENTAL DATE:  ";RDAT$
392 PRINT#-2,"MONTHLY RENT: ";:P
RINT#-2,USINGKK$;M(REC);:PRINT#-
2,"        ";"DEPOSIT:  ";:PRINT#-
2,USINGKK$;D(REC)
394 PRINT#-2
396 PRINT#-2,"PUR. DATE:  ";PUR$
;"   ";"PUR. PRICE:  ";:PRINT#-2
,USINGK1$;PRI(REC);
398 PRINT#-2,"   MONTHLY MORTGAG
E:  ";:PRINT#-2,USINGKK$;Q(REC)
400 PRINT#-2,"LIEN HOLDER: ";LIE
N$;"                     DUE: ";PAY
$;"th"
402 NEXT REC
404 CLOSE#1
406 GOTO42
408 RUN"RENTMENU"
410 OPEN"D",#1,"RENTAL/DAT",145
412 FIELD#1,3 AS COD$,8 AS UDAT$
,20 AS ADR$,15 AS CITY$,2 AS STA
T$,5 AS ZIP$,20 AS NAME$,8 AS PH
ON$,8 AS RDAT$,6 AS MREN$,6 AS D
EP$,8 AS PUR$,8 AS PRIC$,6 AS MO
RT$,20 AS LIEN$,2 AS PAY$
414 RETURN
416 GOTO42
```

300 80
630 96
900 189
1130 22
1510 142
END 13

Listing 3:

```
10 '***FILEMAIN***
20 '**FILE MAINTENANCE PROGRAM**
30 'LISTING #3
40 CLEAR1000
50 CC=164:FOR XX=1 TO 6
60 CLS
70 PRINT@CC,"FILE MAINTENANCE PR
OGRAM"
80 CC=CC-32
90 FOR Z=1TO300:NEXTZ
100 NEXT XX
110 PRINT@107,"SELECTIONS: "
120 PRINT@162,"1) PROPERTY CODES
"
130 PRINT@194,"2) EXPENSE ACCOUN
TS"
140 PRINT@226,"3) INCOME ACCOUNT
S"
150 PRINT@258,"4) END JOB"
```

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Chicago

May 17-19

Where but at **RAINBOWfest** could you meet so many CoCo enthusiasts, see so many new products, and attend seminars that are of immediate assistance? It's the next best thing to receiving the latest issue of THE RAINBOW in your mailbox.

Many of the people who write for THE RAINBOW — and those who are written about — are there to meet you and answer your questions, technical and otherwise. **RAINBOWfest** is CoCo's very own show, and it's a people-to-people event as well as a valuable learning experience.

To make it easier for you to attend, we schedule **RAINBOWfest** in three parts of the country. If you missed the fun in Irvine, Calif., why don't you make plans now to be with us in Chicago, Ill., or New Brunswick, N.J.? Each show is unique, offering fun, new acquaintances, and great sharing experiences. For members of the family who don't share your affinity for CoCo, you'll be comfortable knowing that each **RAINBOWfest** is located in an area that will provide fun and enjoyment for all.

Our Chicago show is being held at the Hyatt Regency Schaumburg, adjacent to

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RAINBOWfest — Chicago
Dates: May 17-19, 1985
Hotel: Hyatt Regency Schaumburg
Rooms: $65 per night, single or double
Advance Ticket Deadline: May 10, 1985

RAINBOWfest — New Brunswick, N.J.
Dates: October 18-20, 1985
Hotel: Hyatt Regency
Rooms: $65 per night, single or double
Advance Ticket Deadline: October 11, 1985

the Woodfield Mall, one of the largest indoor shopping centers in the world. The Hyatt Regency offers special rates for **RAINBOWfest**. The show opens Friday evening with a 7 p.m. to 10 p.m. session. It's a daytime-only show Saturday — the CoCo Community Breakfast is at 8 a.m., then the exhibit hall opens promptly at 10 a.m. and runs continuously until 6 p.m. There will be no exhibition hours or seminars Saturday evening. On Sunday, the exhibit hall opens at 11 a.m. and closes at 4 p.m.

A well-known speaker will again keynote the highly popular CoCo Community Breakfast. And you can set your own pace in the exhibit hall interspaced with a number of seminar sessions on all aspects of CoCo — from improving your BASIC skills to working with the OS-9 system.

But most of all, there will be exhibitors. Lots of them. All ready to demonstrate products of every kind. It's a time for unveiling brand new products. Many have special buys for **RAINBOWfest**. If you've been eyeing something in THE RAINBOW, you can try it out and take it home that very day.

Tickets may be obtained directly from THE RAINBOW. We'll also send you a special reservation form so you can get your special room rate.

Come to **RAINBOWfest**. Let's all celebrate the CoCo Community!

United Airlines and THE RAINBOW have joined together to offer a special discounted fare to those attending **RAINBOWfest** Chicago. Simply by calling United at the toll free number listed below and identifying our meeting, with account number 563-E, you will be eligible for a 20 percent discount on the Easy Saver Fare. The only requirement is a Saturday evening stay.

(800) 521-4041
Account Number 563-E

Show Schedule:

Friday evening — Exhibit hall open from 7 p.m. to 10 p.m.

Saturday — CoCo Community Breakfast at 8 a.m. Exhibit Hall opens at 10 a.m. and closes at 6 p.m.

Sunday — Exhibit Hall open from 11 a.m. to 4 p.m.

FREE T-Shirt to first five ticket orders received from each state.

Make checks payable to:
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P.O. BOX 385
Prospect, KY 40059
(502) 228-4492

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TOTAL ENCLOSED (U.S. FUNDS ONLY, PLEASE)		$ ________

☐ Also send me a hotel reservation card for ( ) Chicago, or ( ) New Brunswick.

NAME *(please print)* ________________
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COMPANY ________________

Orders received less than two weeks prior to show opening will be held for you at the door.

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Signature ________________

```
160 PRINT@394,"(1, 2, 3 OR 4)"
170 AT$=INKEY$:IF AT$=""THEN170
180 ON VAL(AT$) GOSUB 190,730,12
60,1810
190 'PROPERTY CODES
200 CLS:PRINT@9,"PROPERTY CODES"
210 GOSUB 780
220 ON VAL(AT$) GOSUB 240,400,49
0,1240
230 GOTO210
240 'INPUT CODES
250 CLS:PRINT"PREVIOUSLY ENTERED
 PROPERTY      CODES WILL BE LOST
!!"
260 PRINT"DO YOU WANT TO CONTINU
E (Y/N)":INPUT AZ$
270 IF AZ$="N"THEN780
280 X=0:CLS:OPEN"O",#1,"PROPERTY
/ACC"
290 CLS:PRINT" PRESS <ENTER> WHE
N FINISHED":PRINT
300 X=X+1
310 INPUT" PROPERTY CODE: ";COD$
(X)
320 IF COD$(X)="" THEN CLOSE#1:G
OTO190
330 IF LEN(COD$(X))>3 THEN PRINT
"  TOO LONG!! REDO ":GOTO320
340 INPUT" ADDRESS: ";ADR$(X)
350 IF LEN(ADR$(X))>20 THEN PRIN
T"   TOO LONG!! REDO ":GOTO340
360 INPUT" RENTER: ";NAM$(X):PRI
NT
370 IF LEN(NAM$(X))>20 THEN PRIN
T"   TOO LONG!! REDO ":GOTO360
380 WRITE #1, COD$(X),ADR$(X),NA
M$(X)
390 GOTO 300
400 'VIEW ACCOUNTS
410 X=0:CLS:PRINT"          PROPE
RTY CODES":PRINT
420 OPEN"I",#1,"PROPERTY/ACC"
430 IF EOF(1)=-1 THEN CLOSE#1:EX
EC44539:GOTO190
440 X=X+1
450 INPUT#1,COD$(X),ADR$(X),NAM$
(X)
460 PRINTCOD$(X);"    ";NAM$(X)
470 PRINT"        ";ADR$(X)
480 GOTO 430
490 'CHANGE ACCOUNTS
500 X=0:CLS:OPEN"I",#1,"PROPERTY
/ACC"
510 OPEN"O",#2,"TEMP/ACC"
520 IF EOF(1)=-1 THEN 650
530 X=X+1
540 INPUT#1,COD$(X),ADR$(X),NAM$
(X)
550 CLS:PRINT@64,COD$(X);"    ";N
AM$(X)
560 PRINT"        ";ADR$(X)
570 GOSUB1580
580 ON VAL(Q2$) GOSUB 600,520,63
0
590 GOTO 570
600 INPUT" NEW PROPERTY CODE: ";
COD$(X)
610 INPUT" NEW ADDRESS: ";ADR$(X
)
620 INPUT" NEW RENTER: ";NAM$(X)
630 WRITE#2,COD$(X),ADR$(X),NAM$
(X)
640 GOTO520
650 PRINT:INPUT"DO YOU WISH TO A
DD A PROPERTY    (Y/N)";Q3$
660 IF Q3$="N"THEN 690
670 X=X+1
680 GOTO 600
690 CLOSE#2,#1
700 KILL"PROPERTY/ACC"
710 RENAME"TEMP/ACC"TO"PROPERTY/
ACC"
720 GOTO190
730   EXPENSE ACCOUNTS
740 CLS:PRINT@9,"EXPENSE ACCOUNT
S"
750 GOSUB780
760 ON VAL(AT$) GOSUB 860,960,10
```

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```
40,1240
770 GOTO750
780 PRINT@107,"SELECTIONS: "
790 PRINT@162,"1) INPUT ACCOUNTS
"
800 PRINT@194,"2) VIEW ACCOUNTS"
810 PRINT@226,"3) ADD/CHANGE ACC
OUNTS"
820 PRINT@258,"4) RETURN TO MAIN
 MENU"
830 PRINT@394,"(1, 2, 3 OR 4)"
840 AT$=INKEY$:IF AT$="" THEN 84
0
850 RETURN
860 'INPUT ACCOUNTS
870 GOSUB 1760
880 CLS:X=0:OPEN"O",#1,"EXPENSE/
ACC"
890 CLS:PRINT"  PRESS <ENTER> WH
EN FINISHED":PRINT
900 X=X+1
910 INPUT"EXPENSE ACCOUNT: ";EX$
(X)
920 IF LEN(EX$(X))>10 THEN PRINT
"  CATEGORY IS TOO LONG! -REDO!"
:GOTO910
930 IF EX$(X)=""THEN CLOSE#1:GOT
O730
940 WRITE #1,EX$(X)
950 GOTO 900
960 'VIEW ACCOUNTS
970 X=0:CLS:PRINT"       EXPENSE
 ACCOUNTS":PRINT
980 OPEN "I",#1,"EXPENSE/ACC"
990 IF EOF(1)=-1 THEN CLOSE#1:EX
EC44539:GOTO730
1000 X=X+1
1010 INPUT #1,EX$(X)
1020 PRINTX;"    ";EX$(X)
1030 GOTO 990
1040 'CHANGE ACCOUNTS
1050 CLS:X=0:OPEN"I",#1,"EXPENSE
/ACC"
1060 OPEN"O",#2,"TEMP/ACC"
1070 IF EOF(1)=-1THEN 1160
1080 X=X+1
1090 INPUT #1,EX$(X)
1100 CLS:PRINT@64,X;"    ";EX$(X)
1110 GOSUB1580
1120 ON VAL(Q2$) GOSUB 1130,1070
,1140
1130 INPUT"  NEW ACCOUNT: ";EX$(
X)
1140 WRITE#2,EX$(X)
1150 GOTO1070
1160 PRINT:INPUT"DO YOU WISH TO
ADD AN ACCOUNT   (Y/N)";Q3$
1170 IF Q3$="N" THEN1200
1180 X=X+1
1190 GOTO1130
1200 CLOSE#2,#1
1210 KILL"EXPENSE/ACC"
1220 RENAME"TEMP/ACC"TO"EXPENSE/
ACC"
1230 GOTO730
1240 'RETURN TO MAIN MENU
1250 CLS:GOTO110
1260 ' INCOME ACCOUNTS
1270 CLS:PRINT@10,"INCOME ACCOUN
TS"
1280 GOSUB 780
1290 ON VAL(AT$) GOSUB 1310,1410
,1490,1790
1300 GOTO1280
1310 'INPUT ACCOUNTS
1320 GOSUB 1760
1330 CLS:X=0:OPEN"O",#1,"INCOME/
ACC"
1340 PRINT"  PRESS <ENTER> WHEN
FINISHED":PRINT
1350 X=X+1
1360 INPUT"INCOME ACCOUNT: ";IN$
(X)
1370 IF LEN(IN$(X))>10 THEN PRIN
T"  CATEGORY IS TOO LONG! -REDO!
":GOTO1360
1380 IF IN$(X)="" THEN CLOSE #1:
```

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LABEL III — Name and address file-print system. With **LABEL III**, you can develop and maintain a mailing list. Print lists or mailing labels in your choice of 1, 2. or 3 wide. Supports 3 or 4 line addresses with phone optional. FAST machine language sort by last name, first name, or zip code.
CASSETTE—16K EXT Postpaid **$ 19.95**

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With **FILE III** you can create and maintain records on anything you choose. Recipes, coupons, household records, financial records — you name it. You create records containing up to five fields you define. You can search, sort, modify, delete, save on tape and display on the screen or send it to a printer. The program is user friendly and user proof. Prompting is extensive. A comparable program could cost much more. This one is a bargain!
CASSETTE—16K EXT Postpaid **$ 19.95**

PROGRAM FILE (reviewed in October '83 Rainbow) Organize your cassette programs. With **PROGRAM FILE** you can create a file of your computer programs. You can search, sort, modify, add, delete, save on tape and display on screen or printer.
CASSETTE--16K EXT Postpaid **$ 14.95**

DATA MANAGEMENT PACKAGE
Three cassettes above. Postpaid **$ 40.00**

ESPIONAGE ISLAND ADVENTURE (reviewed in June 1984 Rainbow) You have been dropped off on a deserted island by submarine. You must recover some top secret microfilm and signal the sub to pick you up. Problems abound in this 32K adventure.
32K EXT Postpaid Disk — $ 20.95 Cassette — **$ 17.95**

FOUR MILE ISLAND — (reviewed May '84) You are trapped inside a disabled nuclear power plant. The reactor is running away! You must bring the reactor to a cold shutdown and prevent the "China Syndrome". Can you save the plant (and yourself)? It's not easy!
16K EXT Postpaid Disk - $20.95 Cassette --- **$ 17.95**

KINGDOM OF BASHAN — (reviewed in Nov. '84 Rainbow) Our most involved adventure to date. Bashan has a large vocabulary and some unique problems to solve. You must enter BASHAN (not easy), gather the ten treasures of the kingdom while staying alive (even harder), and return to the starting point (harder yet). If you can get the maximum 200 points, you are an expert!
32K EXT Postpaid Disk $ 20.95 Cassette -- **$ 17.95**

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This one is tough! We challenge you to complete this in 30 days! If you can, we will send you any program we sell— postpaid — at absolutely no charge. You start on a disabled sub near the lost city of Atlantis. You must get the sub (and yourself) safely to the surface.
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ADVENTURE STARTER — (reviewed Feb. '84 Rainbow)
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NEW! CUBE ADVENTURE — Cube is a non-violent adventure for a 16K EXT tape or disk system. You must locate and enter the CUBE gathering treasures along the way. You will encounter some unique problems to solve.
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```
GOTO1260
1390 WRITE #1, IN$(X)
1400 GOTO 1350
1410 ' VIEW ACCOUNTS
1420 CLS:X=0:PRINT"        INCOM
E ACCOUNTS":PRINT
1430 OPEN "I",#1,"INCOME/ACC"
1440 IF EOF(1)=-1 THEN CLOSE#1:E
XEC44539:GOTO1260
1450 X=X+1
1460 INPUT#1,IN$(X)
1470 PRINTX;"    ";IN$(X)
1480 GOTO 1440
1490 'CHANGE ACCOUNTS
1500 CLS:X=0:OPEN"I",#1,"INCOME/
ACC"
1510 OPEN"O",#2,"TEMP/ACC"
1520 IF EOF(1)=-1 THEN 1680
1530 X=X+1
1540 INPUT #1,IN$(X)
1550 CLS:PRINT@64,X;"   ";IN$(X)
1560 GOSUB1580
1570 ON VAL(Q2$) GOSUB 1650,1520
,1660
1580 PRINT:PRINT" DO YOU WISH TO
: "
1590 PRINT"  1) CHANGE THE ACCOU
NT"
1600 PRINT"  2) DELETE THE ACCOU
NT"
1610 PRINT"  3) SEE NEXT ACCOUNT
"
1620 PRINT
1630 INPUT Q2$
1640 RETURN
1650 INPUT"  NEW ACCOUNT: ";IN$(
X)
1660 WRITE #2,IN$(X)
1670 GOTO1520
1680 PRINT:INPUT"DO YOU WISH TO
ADD AN ACCOUNT    (Y/N)";Q3$
1690 IF Q3$="N"THEN 1720
1700 X=X+1
1710 GOTO1650
1720 CLOSE#2,#1
1730 KILL"INCOME/ACC"
1740 RENAME"TEMP/ACC"TO"INCOME/A
CC"
1750 GOTO1260
1760 CLS:PRINT"PREVIOUSLY ENTERE
D ACCOUNTS      WILL BE LOST!!"
1770 PRINT"DO YOU WANT TO CONTIN
UE (Y/N)":INPUT AZ$
1780 IF AZ$="N"THENGOTO110ELSE R
ETURN
1790 'RETURN TO MAIN MENU
1800 CLS:GOTO110
1810 'END SUB-ROUTINE
1820 RUN"RENTMENU"
```

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PIPELINE

THE "THIRD WAVE" has arrived with a new organization designed to support the growing number of people who work in their homes with personal computers. The newly formed Association of Electronic Cottagers will bring focus to this group. "We will provide actual business services to both computer entrepreneurs and telecommuters who work at home on a salary," the group's founders, husband-and-wife team Paul and Sarah Edwards, said in announcing the group's formation.

Members of AEC can obtain marketing assistance, business consultation and other services. They can also access up to the minute news about local, state, national and international developments affecting their interests through a monthly newsletter, an online hotline, bulletin boards, electronic conferences and private databases available to AEC members through CompuServe Information Service. Aspiring cottagers can get help finding work at home and assistance in setting up a computer-based business.

Electronic cottage members are already mobilizing to protect their rights to work at home with a computer by opposing AFL/CIO efforts to ban telecommuting and by setting forth the Electronic Cottage Bill of Rights.

Those interested in AEC can write the Association for free information at 677 Canyon Crest Drive, Sierra Madre, CA 91024.

* * *

PUT YOUR COMPUTER TO WORK. *Making Money with Your Home Computer*, written by Dana K. Cassell, has been published by Dodd, Mead & Co. A paperback retailing for $5.95, the book tells home computer owners what software to buy, how to get started, where to look for potential customers, what services to offer and how to build and maintain a profitable and satisfying computer service bureau business.

It can be ordered through Dodd, Mead & Co., Dept. CDH, 79 Madison Ave., New York, NY 10016, for $5.95 plus $1.50 postage; or order by phone using Visa or MasterCard: 1-800-251-4000.

* * *

'C' YOUR REFERENCE CARD. If you program in the C language, or are learning it, you can now get information you need from the first comprehensive C reference card. The card, entitled "C LANGUAGE," is a two-sided two-color 8½ by 11-inch plastic card filled with four point type. It covers the full implementation of the language and auxiliary utilities, too.

Covered are: statement summary; basic data types; conversion of data types; operator definitions with precedences and associativity; escape characters; preprocessor statements; typedef; constants; scope of variables; arrays; pointers; functions; structures; unions; enumerated data types; printf; scanf; the UNIX (tm) cc command; the lint command; a summary of over 100 commonly used library functions; command line arguments; tools under UNIX; ASCII; and more.

The summary was written by Stephen Kochan, author of *Programming in C* (Hayden Book Company) and consultant to Bell Labs. Micro Chart #11 and other summaries are available with a money-back guarantee for $5.95 each (plus $1 postage) from Micro Logic, POB 174, Dept. P, Hackensack, NJ 07602; phone (201) 342-6518.

* * *

THOSE SUMMER DAYS. "How I Spent My Summer Vacation" essays will never be the same for youngsters attending the 1985 National Computer Camps. Camp locations are in Simsbury (Hartford), Connecticut; Atlanta, Georgia; St. Louis, Missouri; Pepper Pike (Cleveland), Ohio; and Garrison (Baltimore), Maryland. The camps are directed by Dr. Michael Zabinski, professor at Fairfield University. Dr. Zabinski serves as a consultant to school systems throughout the country.

Campers may sign up for one or more weeks during June, July and August. The coed campers, ages 9-18, will have small group instruction on TRS-80 and Apple computers. Dr. Zabinski will be assisted by experienced elementary and secondary school teachers.

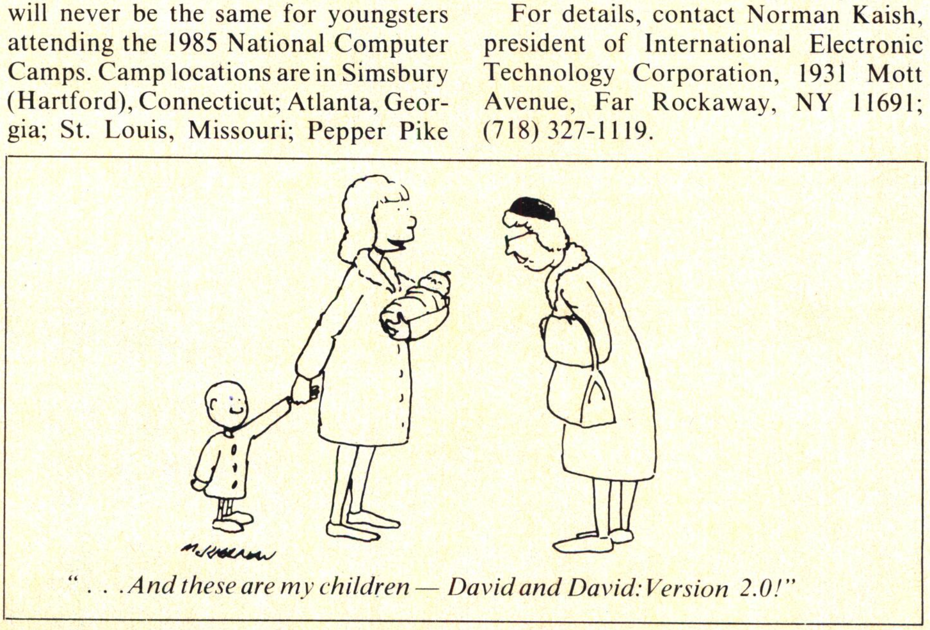
The camp is for youngsters of all levels of experience including no experience whatsoever. In addition to computers, the campers will have access to recreational facilities including swimming and tennis.

For further information and a brochure contact Michael Zabinski, Ph.D., at (203) 795-9667, or write to National Computer Camps, Box 585, Orange, CT 06477.

* * *

INTERNATIONAL ELECTRONIC Technology has established the Center for Electronic Theft Prevention. This center will utilize a new advancement to the Kaish Circuit Lockout system, which will allow authorized service centers to re-program chips that are on Circuit Lockout via telephone links with the center without removal or replacement of the Lockout chip.

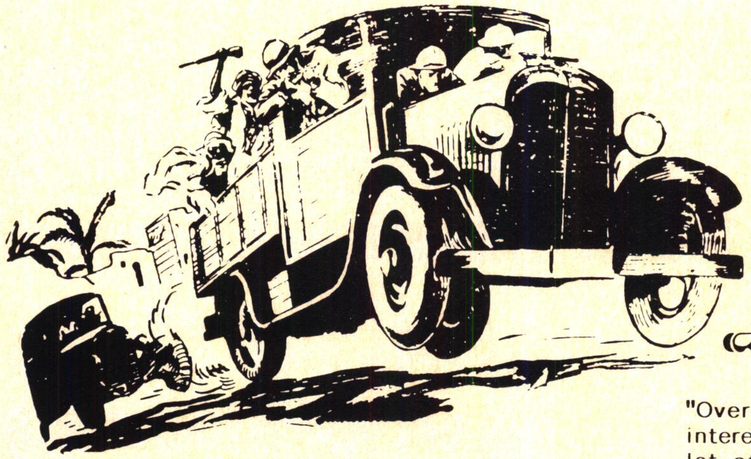
For details, contact Norman Kaish, president of International Electronic Technology Corporation, 1931 Mott Avenue, Far Rockaway, NY 11691; (718) 327-1119.



". . . And these are my children — David and David: Version 2.0!"

Talking version included !

SPECTRUM ADVENTURE GENERATOR



The Spectrum Adventure Generator (SAG) allows you to create silent and talking adventure games that are 100% machine language and very fast in execution. Up to 99 rooms, 255 objects, 70 command words and 255 conditional flags can be used. Get a head start in this month's Rainbow Adventure Contest NOW! 32K/64K DISK $39.95

Note - Talking version requires Spectrum Projects' Voice Pak, a Disk "Y" Cable or Multipak and 64K.

☞ Quotes from Jorge Mir (#1 CoCo Adventure Expert) from Dec'84 Rainbow Review -

"Overall, I think this is a great system for those interested in writing adventures. It sure eliminates a lot of time involved in developing them and allows the non-programmer to develop some very interesting Adventures since no programming knowledge is required. Try SAG, you'll like it!"

$100 REWARD for all SAG winning entries in the Third Annual Rainbow Adventure Contest !

THE RAINBOW BOOKSHELF

The Complete Rainbow Guide To OS-9

by #1 CoCo OS-9 Expert - Dale Puckett

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Hi-Res Graphics	NO	YES
Visicalc cmd format	NO	YES

DYNACALC now runs on CoCo DOS!
New low price! 64K Disk $79.95
(see Sept '84 Rainbow Review)

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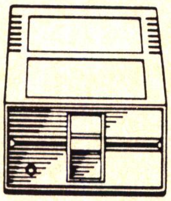

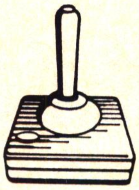

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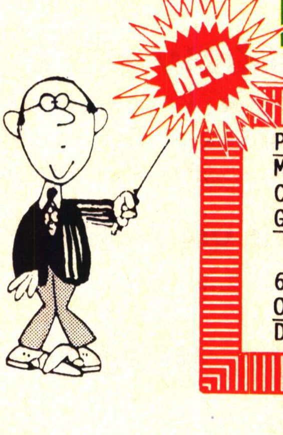

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No.1

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By James W. Wood

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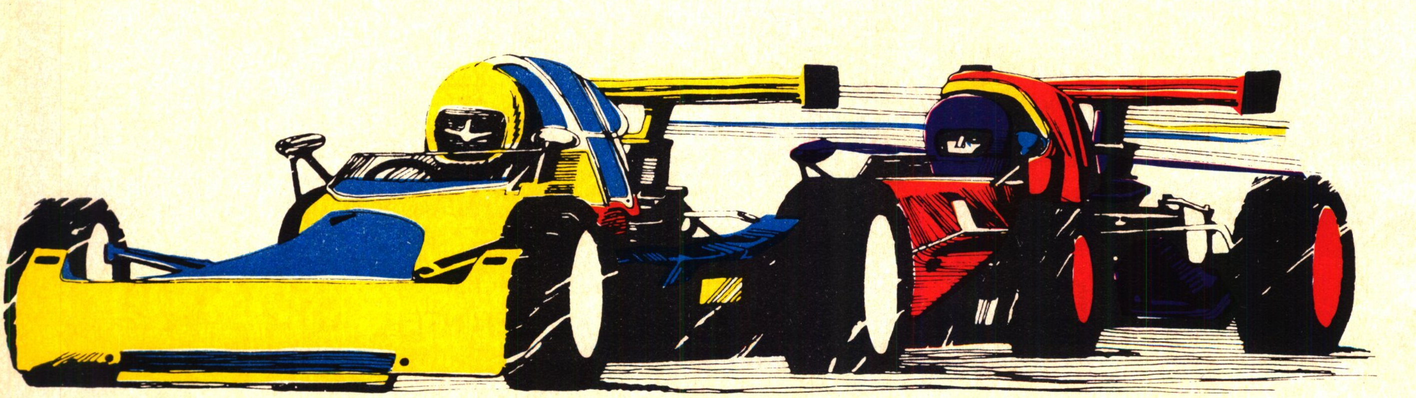
As the game proceeds, it becomes more difficult. After a short while, the cars that appear at the top of the screen will jump from their original lanes into the other lane. The cars only show in five positions as they move from the top to the bottom of the screen. If one lane jump doesn't cause you to rear-end them, the game will later cause the cars to possibly jump lanes in the second and third positions as they come down the screen.

There is room for improvement in *Racer*. (Isn't that the best part?) One could add a better title page or add lines to allow more than one crash. The crash sequence could stand improvement; perhaps a high resolution crash could be stored on graphics Page six and shown at the moment of impact. Study the line description to decide which enhancement you will program, or enjoy the game "as is."

(James Wood teaches high school math, science, computer programming and photography. He has master's degrees in both physical science education and instructional media.)



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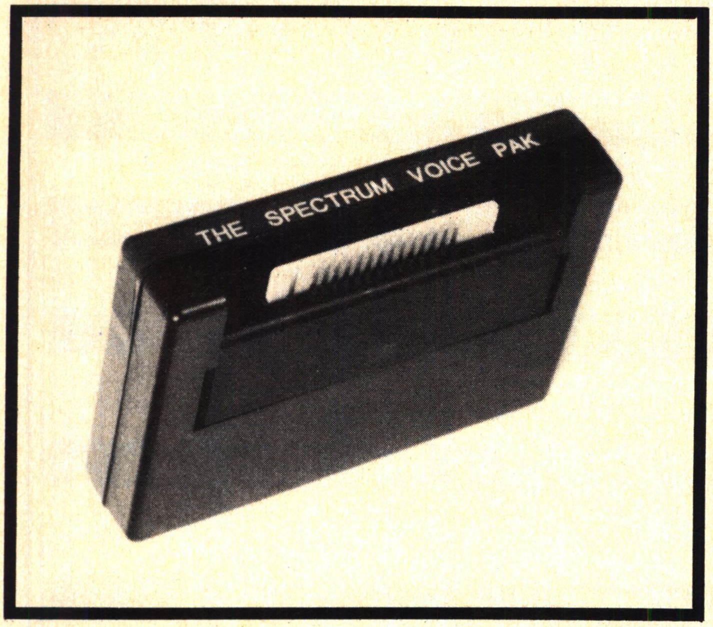

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NEW!

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Line	Description
20	Reserves memory for high resolution graphics
30	Title screen
40	Reserves memory for graphics arrays
50-130	Draws race cars for computer and player and stores them
140-240	Draws three views of the road on three different pages
250-280	Stores locations where race cars can be PUT
300-320	Deals with flipping pages
330	Sets computer's car at top of screen
340	Sets computer's car into second position after certain number of miles
350	Sets computer's car into third position after certain number of miles
360	Puts computer's car onto screen
370	Sets computer's car back to top of screen
380	Resets keyboard memory
390	Sets player's car's position according to arrow key pressed
400	Puts player's car onto screen
410	Shows Hi-Res screen which was just drawn
420	Keeps track of mileage
430	Determines if crash occurred
440	Variable to flip to correct road screen
450	Back to top of animation loop
460	Random color flash, crash sequence
470-490	Ending message

270 65
END 72

The listing:

```
10 REM JAMES W. WOOD, 424 N. MIS
SOURI, ATWOOD, IL, 61913
20 PCLEAR5:CLS0
30 FORA=160TO180:SOUNDRND(150)+5
0,1:PRINT@A," R A C E R";:NEXTA
40 DIM R(10),S(10),X(0,4),M(0,14
)
50 PMODE0,1:PCLS
60 CR$="D10L2U4R2D16L2U4R2D6R6U6
R2D4L2U16R2D4L2U10L6BR2BD12U1R2D
1"
70 DRAW"BM2,0S4"+CR$
80 GET(0,0)-(10,24),X,G
90 PCLS
100 DRAW"BM4,0S6"+CR$
110 DRAW"BR2D2L6"
120 PAINT(6,30),1,1
130 GET(0,0)-(20,48),M,G
140 PMODE0,1:PCLS
150 B=0:GOSUB210
160 PMODE0,2:PCLS
170 B=14:GOSUB210
180 PMODE0,3:PCLS
190 B=28:GOSUB210
200 GOTO250
210 LINE(100,0)-(75,191),PSET
220 LINE(150,0)-(175,191),PSET
230 FORA=1TO190STEP42
240 LINE(125,A+B)-(125,A+B+7),PS
ET:NEXTA:RETURN
250 FORA=1TO10:READ R(A):NEXTA
260 DATA 106,104,100,94,88,130,1
35,138,140,144
270 FORA=1TO10:READ S(A):NEXTA
280 DATA 10,40,70,100,140,10,40,
70,100,140
290 A=1:D=88
300 IFE=4THENE=5ELSEE=4
310 PMODE0,E
320 PCOPY A TO E
330 IF G=0 THEN G=1:IF RND(2)=1
THEN H=1:GOTO360 ELSE H=6:GOTO36
0
340 IF J>50 AND G=1 THEN G=2:IF
RND(2)=1 THEN H=2:GOTO360 ELSE H
=7:GOTO360
350 IF J>100 AND G=2 THEN G=3:IF
 RND(2)=1 THEN H=3:GOTO360 ELSE
H=8:GOTO360
360 PUT(R(H),S(H))-(R(H)+10,S(H)
+24),X,PSET:H=H+1
370 IF H=6 OR H=11 THEN G=0
380 POKE343,255:POKE344,255
390 IF PEEK(343)=247 THEN D=88EL
SE IF PEEK(344)=247 THEN D=144
400 PUT(D,140)-(D+20,188),M,PSET
410 SCREEN1,1
420 J=J+1
430 IF H=5 AND D=88 OR H=10 AND
D=144 THEN 460
440 A=A+1:IFA=4THENA=1
450 GOTO300
460 SCREEN0,0:FOR AA=1TO20:CLSRN
D(9)-1:PLAY"L255O1"+CHR$(64+RND(
7)):NEXTAA
470 CLS:PRINT@260,J/10;"MILES"
480 PRINT"PLAY AGAIN (Y/N)"
490 A$=INKEY$:IFA$="Y"THENCLS0:R
UN ELSE IF A$="N"THENEND ELSE 49
0
```

See You At

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May 17-19

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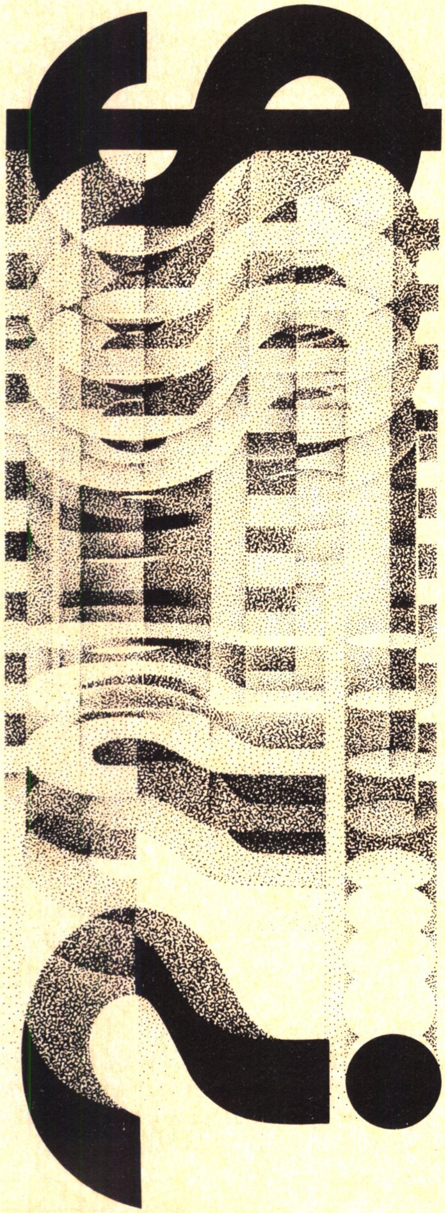


By William S. Bonnell

In business, projects are attractive if they produce a rate of return on investment greater than a company's cost of capital. This produces a net inflow of cash into the company. If a company has unlimited funds, it invests in all projects having a rate of return greater than the company cost of capital. In reality, projects are rejected even though they have a favorable rates of return because funds are limited.

Capital budgeting ranks projects according to their financial attractiveness and selects the set which maximizes the present worth (PW) of the firm. One method of capital budgeting compares projects on the basis of present worth, considering those for investment which have a cash flow rate of return (CFRR) greater than some minimum required rate of return, the cost of capital.

The program described in this article determines the CFRR and PW of a project and allows sensitivity testing of the assumptions made in the calculations.

The required parameters for calculation of CFRR and PW for a project are:

1) Expenses by year
2) Savings by year
3) Capital investment by year
4) Tax rate percent
5) Investment tax credit percent
6) Type of depreciation
7) Depreciation life of capital
8) The required rate of return percent

Expenses are defined as the annual cost of operations. They are not depreciated. They represent the outflow of cash resulting from the alternative being investigated. Savings are the opposite of expenses and represent the inflow of cash from the alternative in question. Expenses can be netted out of savings or both can be entered separately. Examples of expenses are labor, overhead and raw materials. Savings result from prevented expenditures or reductions in labor, overhead and raw materials.

Capital expenditures are investments in building and equipment which are allowed by law to be recovered over time through depreciation.

The tax rate is the percentage of profits which the organization must pay to the government. Investment tax credit is a means the government uses to stimulate business investment in capital equipment. Generally in the year following the capital expenditure, the organization is not taxed for a percentage of the expenditure.

The required rate of return depends on the nature of the company involved.

(William Bonnell is an industrial engineer specializing in modeling of manufacturing and business computer systems. He has a master's degree in management science and 15 years experience with large organizations.)

If the company finances its operations by borrowing, the cost of capital is the borrowing rate. If projects have a rate of return greater than the borrowing rate, they will be profitable. Therefore, the required rate of return is the borrowing rate.

In companies financing their operations by common stock or a combination of stock and debt, the cost of capital is more difficult to determine. In these cases, the cost of capital may be a policy variable supplied by management as a benchmark for comparison of projects in general. It may be unrelated to the true cost of capital funds to the company.

The PW of a project is defined as the net cash flow (inflow-outflow) when all flows have been discounted to the present. The basis for this concept is a dollar invested for one year is worth more than a dollar at the end of the year. Similarly, a dollar received a year from now is not worth as much as a dollar now. The value now of a dollar received a year from now is:

1/(1+r).

where 'r' is the rate of return a dollar could earn if invested at the company's cost of capital. The value now of one dollar received two years from now is:

1/(1+r)**2.

(Note: ** is used as a symbol for exponentiation.)

And in general, the value of a dollar received N years from now is:

1/(1+r)**N

If a company spends $1,000 on a piece of equipment which will save $400 each year for 5 years, what is the PW of this project, ignoring taxes and depreciation, if the company can earn 10% from other investments?

-1000/(1+.1)**0 + 400/(1+.1)**1 + 400/(1+.1)**2 +400/(1+.1)**3 + 400/(1+.1)**4 + 400/(1+.1)**5

The present worth (PW) is $516.31. The straightforward answer might seem to be $1,000 since $1,000 went out and $2,000 came in, but this ignores the alternative uses of these funds.

Cash flow rate of return (CFRR) is defined as the rate, 'r,' which makes PW equal to zero in the following equation:

PW = CF1 + CF2/(1+r)**1 + CF3/(1+r)**2 + ... + CFN/(1+r)**N-1

where "CFN" is the net cash flow (in-out) at the beginning of year 'N' (or at the end of year N-1).

CFRR is analogous to lending a sum of money and receiving annual payments which eventually pay off the original deposit plus interest. The interest rate earned is like CFRR.

To be accurate and of use in business, tax and depreciation effects on taxes must be considered. Depreciation is a method for recovering the cost of capital assets over time. Government policy determines how quickly the investment can be recovered. Faster recovery is more beneficial to business because of the time-value of money. Money recovered sooner is more valuable than money recovered later.

There are many methods of depreciation depending on the type and life of the asset. Using straight line depreciation, 20% of an asset's value can be recovered each year after the first, assuming a five-year tax life. It is recovered by subtracting depreciation from profits. This means a company can shield a portion of its profits from taxes by depreciating its assets. This is an incentive for investment in new assets.

An accelerated method of depreciation is Sum of the Year's Digits (SOYD). If an asset has a depreciation life of five years, the SOYD is 15 (1+2+3+4+5). In the first year after the capital expenditure, this method would allow 5/15 or .3333 of the asset value to be deducted from profits before calculating taxes. In subsequent years 4/15, 3/15, 2/15, 1/15 of the asset value could shield profits from taxes. The sum of these depreciation factors is usually one.

Double-declining balance is another accelerated method of depreciation. In the first year after capital expenditure, the depreciation factor is two divided by the asset life. In subsequent years, the remaining fraction to be depreciated is multiplied by 2/(asset life). The remaining fraction is the previous remaining fraction less the current depreciation factor. Refer to Listing 1, lines 670-1100 for calculation of depreciation factors.

Once the depreciation factors have been determined, the after-tax cash flow is calculated for each year.

Cash Flow = Savings – Tax Rate*(Tax Base) – (Expense+Capital) + Investment Tax Credit

Tax Base = Savings – (Expense + Depreciation)

Investment Tax Credit = Tax Credit % * Capital Investment In The Previous Year

Refer to Listing 1, lines 1110 - 1250 for this calculation.

This annual net cash flow is then adjusted for the time-value of money at the company cost of capital. It is summed to get the net present worth of the project. The CFRR is calculated by finding rate of return, 'r,' which just makes cash inflows equal to cash outflows, causing PW to equal zero.

The Program

The program was written for the 16K Color Computer using disk or cassette. It should run on any computer using standard BASIC with very few modifications.

Data entry is prompted or menu driven. If flows become constant, the program allows one value to be entered for several years. There are four standard types of depreciation to choose from or factors may be entered manually.

After the data has been entered, the program calculates and displays the depreciation flows, the after-tax cash flow and the discounted after-tax cash flow using 15% as the discount rate. Present worth is calculated for various required rates of return. When PW changes sign from a positive to negative (passes through zero), that is the CFRR.

After the display of output is complete, data values can be changed and the problem rerun. This is a powerful tool for sensitivity analysis. Finally, data may be saved or read from disk or cassette. A report can be generated on a printer.

The algorithm to calculate CFRR is shown in Listing 1, lines 1510 to 1790. It is a binary search algorithm. If CFRR is in the range zero to 100 percent, the interval containing the CFRR is halved each iteration until one endpoint is within three percent of the other.

At that point, the program interpolates for a final value of CFRR. For example, if the PW at R=100% is less than zero and PW at R=0 is greater than zero, PW is calculated at R=50%. If PW at 50 percent is less than zero, PW is found at R=75%. If PW at R=75% is greater than zero then PW is found at R=62.5%, and so on until the difference between successive R's is less than three percent. The program then interpolates the final CFRR.

To illustrate its use and verify your entry of the program, try the following example problem:

A company spends $10,000 on a new computer system. By spending this amount, labor savings of $4,000 are expected each subsequent year for 10 years. The company tax rate is 48% and an investment tax credit of 10% is available. It will cost $500 per year for supplies for the new computer and $400 per year for maintenance.

Computers can be depreciated with a five year life using double-declining balance switching to SOYD. What is the present worth of this investment if the company can earn 15% on alternative investments? What is the CFRR for this project?

INPUT DATA

Start Year	Expense	Savings	Capital
1	0	0	10000
2 - 11	900	4000	0

Required Rate Of Return = 15%
Tax Rate = 48%
Investment Tax Credit = 10%

Listing 2 shows my inputs and the computer responses to solve this problem. It was produced by echoing the screen output to the printer. A printer report is also generated.

At 15 percent, this project has a positive net present worth indicating a worthwhile investment. The CFRR of 22 percent is greater than can be earned on the average investment available to the company (15 percent).

If other investments are available, they should be compared on the basis of present worth. Comparing on the basis of CFRR can, in some cases, lead to the wrong conclusion. The CFRR should be a "go/no go" comparison with the required rate of return for the company.

```
Project life=11 years
Depreciation life=5 years
Tax rate=48 percent
Investment tax credit=10 percent


Year  Expense      Savings       Capital      Dpr. Flow     Cash Flow
 1    $   0.00   $     0.00   $10,000.00   $     0.00   -$10,000.00
 2      900.00     4,000.00         0.00     2,000.00      3,572.00
 3      900.00     4,000.00         0.00     3,200.00      3,148.00
 4      900.00     4,000.00         0.00     2,100.00      2,620.00
 5      900.00     4,000.00         0.00     1,500.00      2,332.00
 6      900.00     4,000.00         0.00       900.00      2,044.00
 7      900.00     4,000.00         0.00       300.00      1,756.00
 8      900.00     4,000.00         0.00         0.00      1,612.00
 9      900.00     4,000.00         0.00         0.00      1,612.00
10      900.00     4,000.00         0.00         0.00      1,612.00
11      900.00     4,000.00         0.00         0.00      1,612.00

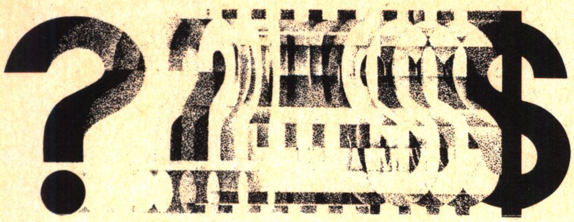

Required           Present Worth
  15%              -$2307.51
  30%              - 1742.79
  45%              - 3846.28
  60%              - 5107.03
  75%              - 5940.91
  90%              - 6532.03

  CFRR = 22.18%
```

Hopefully, the value of this program has been demonstrated for analyzing alternative business investments. The concept is more fully explained in any good financial textbook.

List of Variables

Variable	Function
A	Choice of option
A$	Answer to prompts
CA()	Capital expenditure array
CC	Capital input value
CF()	Net cash flow array
D	Device for I/O
DC	Discounted cash flow
DF()	Depreciation factors
DL	Depreciation life
DP()	Depreciation component of cash flow
DT	Depreciation type
E1	End year for editing changes
EE	Expense input
EX()	Expense array
F$	Filename
FR	Double-declining balance fraction
I,I1, J,K	Various year counters
N	Net present value (NPV)
N6	NPV in CFRR interpolation
OD	Old depreciation life
OP	Old project life
P9	Payback time
PB	Discounted payback time
PL	Project life
PW	Present worth (PW)
PW()	PW array for various rates of return
R	Calculated CFRR
R3,R4, R5,R6	Used in binary search CFRR calculation
RL	Remaining life in depreciation
RR	Required rate of return (ROR)
RR()	RORs used to calculate PW()
RV	Remaining value in depreciation
S1	Start year for editing data
SA()	Savings array by year
SF	Sum of cash flows in finding payback
SS	Savings input value
SY	Sum of years digits
TC	Investment tax credit value
TX	Tax rate
V1	Value to change in editing data
YY	Year when input flows become constant



190	48	1750	25
430	122	2000	26
670	4	2250	104
970	33	2490	5
1220	58	2680	118
1470	241	END	63

```
10 CLS
20 PRINT"  *********************
*******"
30 PRINT"  * CFRR PROGRAM, W. BO
NNELL *"
40 PRINT"  *    3/24/1983 COPYRI
GHT   *"
50 PRINT"  *********************
*******"
60 '
70 PRINT:PRINT
80 DIM EX(20),SA(20),CA(20),DF(2
0),DP(20),CF(20),RR(6),PW(6)
90 INPUT "MENU ENTRY OR REGULAR
ENTRY M/R";A$
100 IF LEFT$(A$,1)="M" THEN 1810
110 GOSUB 130:GOSUB 190:GOSUB 36
0:GOSUB430:GOSUB500:GOTO 1110
120 '
130 IF PL>0 THEN CLS:PRINT"OLD P
ROJECT LIFE="OP"YEARS"
140 INPUT "PROJECT LIFE";PL:OP=P
L
150 IF PL>20 THEN 130
160 IF PL<1 THEN 130
170 RETURN
180 '
190 IF OD>0 THEN CLS: PRINT"OLD
DEPRECIATION LIFE="OD
200 INPUT "DEPRECIATION LIFE";DL
:OD=DL
210 CLS
220 IF DL>20 THEN 190
230 IF DL<1 THEN 190
240 PRINT
250 PRINT "DEPRECIATION TYPES:"
260 PRINT "1. SUM OF YEARS DIGIT
S"
270 PRINT "2. DOUBLE DECLINING B
ALANCE"
280 PRINT "3. STRAIGHT LINE"
290 PRINT "4. DDB->SOYD 1/2YR.AV
ERAGING"
300 PRINT "5. ENTER OWN FACTORS"
310 INPUT"CHOOSE";DT
320 ON DT GOSUB 690,740,820,900,
1030
330 PRINT
340 RETURN
350 '
360 IF TX>0 THEN CLS:PRINT"OLD T
AX RATE=";TX*100
370 INPUT "TAX RATE IN %";TX
380 IF TX>99 THEN 360
390 IF TX<0 THEN 360
400 TX=TX/100
410 RETURN
420 '
430 IF TC>0 THEN CLS: PRINT "OLD
 INV. TAX CREDIT=";TC*100
440 INPUT "INV. TAX CREDIT IN %"
;TC
450 IF TC<0 THEN 430
460 IF TC>99 THEN 430
470 TC=TC/100
480 RETURN
490 '
500 INPUT"DO ANNUAL FLOWS BECOME
 CONSTANT     Y/N  ";A$
510 IF LEFT$(A$,1)<>"Y" THEN 590
520 CLS
530 INPUT "YEAR WHEN FLOWS BECOM
E CONSTANT";YY:IF YY>PL THEN 530
540 PRINT "FOR YEAR WHEN FLOWS A
RE CONSTANT  ENTER:"
550 PRINT
560 PRINT "EXPENSE,SAVINGS,CAPIT
AL FLOWS": INPUT EE,SS,CC
570 FOR I=YY TO PL:EX(I)=EE:SA(I
)=SS:CA(I)=CC:NEXT I
580 PRINT
590 PRINT"YEAR  EXPENSE, SAVING,
 CAPITAL"
600 IF YY=0 THEN YY=PL
610 FOR J=1 TO YY-1
620 PRINT USING "##  ";J;
630 INPUT EX(J),SA(J),CA(J)
640 NEXTJ
650 RETURN
660 '
670 'GET DEPRECIATION FACTORS
680 'SUM OF YEARS DIGITS TYPE
690 IF INT(DL)=DL THEN SF=DL*(DL
+1)/2 ELSE SF=(DL+.5)*(DL+.5)/2
700 FOR J=DL TO 0 STEP -1
710 DF(DL-J+1)=J/SF
720 NEXT J
730 RETURN
```

```
740 'DOUBLE DELCINING BALANCE
750 RV=1
760 FOR I=1 TO DL+.5
770 FR=2/DL
780 DF(I)=RV*FR
790 RV=RV-DF(I)
800 NEXT I
810 RETURN
820 'STRAIGHT LINE
830 RV=1
840 FOR I=1 TO DL
850 DF(I)=1/DL
860 RV=RV-DF(I)
870 NEXT I
880 DF(I)=RV
890 RETURN
900 'DDB TO SOYD 1/2 YR AVG CONV
NTN SWITCH IN 2ND YEAR
910 DF(1)=1/DL
920 RV=1-DF(1)
930 DF(2)=2/DL*RV
940 RV=RV-DF(2)
950 RL=DL-1.5
960 IF INT(RL)=RL THEN SY=RL*(RL
+1)/2:EN=1 ELSE SY=(RL+.5)*(RL+.
5)/2
970 K=2
980 FOR I=RL TO 0 STEP -1
990 K=K+1
1000 DF(K)=I/SY*RV
1010 NEXT
1020 RETURN
1030 'OWN FACTORS
1040 CLS:PRINT "ENTER"DL"FACTORS
"
1050 FOR I=1 TO DL
1060 PRINT USING "## ";I;
1070 INPUT DF(I)
1080 NEXT
1090 RETURN
1100 '
1110 'GET DEPR. AND AFTER TAX FL
OWS
1120 CLS
1130 PRINT:PRINT "START DEPREC A
FTER TAX DISCOUNT"
1140 PRINT"OF YR. FLOW  CASH FLO
W  @ 15%"
1150 FOR I=1 TO PL
1160 IF I>DL THEN I1=I-INT(DL) E
LSE I1=1
1170 FOR K=I1 TO I
1180 DP(I)=DP(I)+CA(K-1)*DF(I-K+
1)
1190 NEXT K
1200 CF(I)=SA(I)-TX*(SA(I)-(EX(I
)+DP(I)))-(EX(I)+CA(I))+TC*CA(I-
1)
1210 PRINT USING "## ";I;
```

```
1220 PRINT USING "######.##";DP(
I);CF(I);CF(I)/(1.15)^(I-1)
1230 NEXT I
1240 INPUT "HIT ENTER TO CONTINU
E";A$
1250 CLS
1260 '
1270 'PRESENT WORTH
1280 PRINT
1290 PRINT "REQUIRED   AFTER TAX
"
1300 PRINT " RATE %  PRESENT WOR
TH"
1310 J=0
1320 FOR R=.15 TO .91 STEP .15
1330 J=J+1:RR(J)=R*100
1340 PW=0:SM=0
1350 FOR I=1 TO PL
1360 DC=CF(I)/(1+R)^(I-1)
1370 SM=SM+CF(I)
1380 PW=PW+DC
1390 IF PB=0 THEN IF PW>0 THEN P
B=I:RR=R
1400 IF P9=0 THEN IF SM>0 THEN P
9=I
1410 NEXT I
1420 PRINT USING "  ## %  ";100*
R;
1430 PRINT USING "######.##";PW
1440 PW(J)=PW
1450 NEXT R
1460 IF P9-1>0 THENPRINT "STRAIG
HT PAYBACK"P9-1"YEARS"
1470 IF PB-1>0 THENPRINT "DISCOU
NTED PAYBACK"PB-1"YEARS" ELSE PR
INT "NO DISCOUNTED PAYBACK"
1480 IF RR=0 THEN RR=.15
1490 PRINT"     AT "RR*100"%"
1500 '
1510 'GET CFRR
1520 R=0:R3=0:R5=0:R6=0:N6=0
1530 R4=1
1540 GOSUB 1690
1550 IF N<=0 THEN GOTO 1760
1560 R=R4
1570 GOSUB 1690
1580 IF N>=0 THEN R=100:GOTO 176
0
1590 R=(R3+R4)/2
1600 IF ABS(R6-R)<=.03 THEN 1730
1610 R6=R:N6=N
1620 GOSUB 1690
1630 IF N<0 THEN GOTO 1660
1640 IF N>0 THEN 1670
1650 IF N=0 THEN 1760
1660 R4=R:GOTO 1590
1670 R3=R:GOTO 1590
1690 PRINT@416,"wait ";:N=0:FOR
I=1 TO PL:N=N+CF(I)/(1+R)^(I-1):
```

```
NEXT I
1700 PRINT @420,STRING$(4,8);
1710 RETURN
1720 GOTO 1780
1730 N6=N
1740 GOSUB 1690
1750 R=(R-N*(R-R6)/(N-N6))*100
1760 R=INT(100*R+.5)/100
1770 PRINT
1780 PRINT@416,"CFRR="R"%"
1790 INPUT "HIT ENTER TO CONTINU
E";A$:PRINT
1800 '
1810 'CHANGE DATA ROUTINE
1820 CLS
1830 PRINT "   entry/change menu
"
1840 PRINT "1. PROJECT LIFE"
1850 PRINT "2. DEPRECIATION LIFE
"
1855 PRINT "3. EXPENSES"
1860 PRINT "4. SAVINGS"
1870 PRINT "5. CAPITAL"
1890 PRINT "6. TAX RATE"
1900 PRINT "7. INV. TAX CREDIT"
1910 PRINT "8. SAVE DATA IN FILE
"
1920 PRINT "9. READ DATA IN FILE
"
1930 PRINT "10.RUN"
1940 PRINT "11.PRINT REPORT-(AFT
ER OPT.10)"
1950 PRINT "12.STOP"
1960 INPUT "CHOOSE";A
1970 ON A GOSUB 130,190,2020,212
0,2220,360,430,2320,2420,2540,26
20
1980 IF A=10THEN GOSUB 320:GOTO
1120
1990 IF A=12THEN STOP
2000 GOTO 1810
2010 '
2020 CLS:PRINT"YR      EXPENSE
YR      EXPENSE"
2030 FOR I=1 TO PL
2040 PRINT USING "## ";I;:PRINT
USING "$$#######.## ";EX(I);
2050 NEXT
2060 PRINT:PRINT"ENTER START,END
 YR,EXPENSE":INPUT S1,E1,V1
2070 FOR I=S1 TO E1
2080 EX(I)=V1
2090 NEXT
2100 RETURN
2110 '
2120 CLS:PRINT"YR      SAVINGS
YR      SAVINGS"
2130 FOR I=1 TO PL
2140 PRINT USING "## ";I;:PRINT
USING "$$#######.## ";SA(I);
2150 NEXT
2160 PRINT:PRINT"ENTER START,END
 YR,SAVINGS":INPUT S1,E1,V1
2170 FOR I=S1 TO E1
2180 SA(I)=V1
2190 NEXT
2200 RETURN
2210 '
2220 CLS:PRINT"YR      CAPITAL
YR      CAPITAL"
2230 FOR I=1 TO PL
2240 PRINT USING "## ";I;:PRINT
USING "$$#######.## ";CA(I);
2250 NEXT
2260 PRINT:PRINT"ENTER START,END
 YR,CAPITAL":INPUT S1,E1,V1
2270 FOR I=S1 TO E1
2280 CA(I)=V1
2290 NEXT
2300 RETURN
2310 '
2320 INPUT"ENTER OUTPUT FILE NAM
E";F$
2330 INPUT"TO DISK OR TAPE D/T";
A$:IF LEFT$(A$,1)="D" THEN D=1 E
LSE D=-1:AUDIOON
2340 OPEN "O",#D,F$
2350 PRINT #D,PL;DL;TX;TC;DT;OD;
OP;
2360 FOR I=1 TO PL
2370 PRINT #D,EX(I);SA(I);CA(I);
2380 NEXT I
2390 CLOSE D
2400 RETURN
2410 '
2420 INPUT"ENTER INPUT FILE NAME
";F$
2430 INPUT"FROM DISK OR TAPE D/T
";A$:IF LEFT$(A$,1)="D" THEN D=1
 ELSE D=-1:AUDIOON
2440 OPEN "I",#D,F$
2450 IF EOF(D)=-1THEN GOTO2500
```

One-Liner Contest Winner . . .

This program, adapted from an algorithm used on a Texas Instruments 57 programmable calculator, computes the interest per period for normal annuities.

The listing:

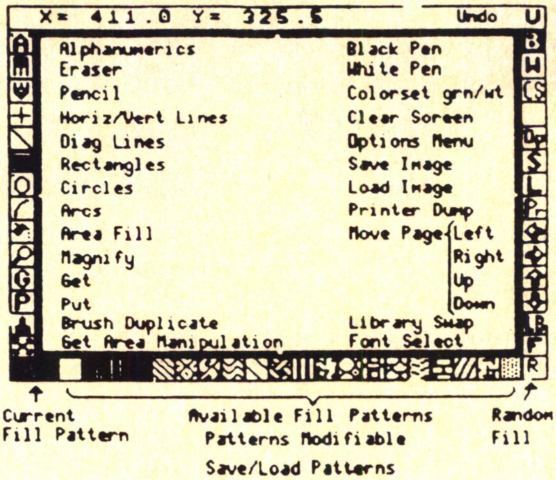
```
1 PRINT:INPUT"PRESENT VALUE";PV:
INPUT"PAYMENT        ";PMT:INPUT"#
 PERIODS      ";N:F=PMT/PV:I=1.05:
FORT=1TO30:I=(1-I^-N)*F+1:NEXT:P
RINT USING "INTEREST IS    ###.##
 PERCENT";(I-1)*100:RUN
```

Bob vanderMark
Groningen, The Netherlands

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

```
2460 INPUT #D,PL,DL,TX,TC,DT,OD,
OP
2470 FOR I=1 TO 20
2480 IF EOF(D)=-1THEN I=20:GOTO2
500
2490 INPUT #D,EX(I),SA(I),CA(I)
2500 NEXT I
2510 CLOSE D
2520 RETURN
2530 '
2540 'INITIALIZE THEN RERUN
2550 FOR I=0 TO 20
2560 DF(I)=0:CF(I)=0:DP(I)=0
2570 NEXT
2580 PB=0:P9=0:RR=0
2590 GOSUB 320 'DEPREC
2600 GOTO 1120
2610 '
2620 'PRINTER REPORT
2630 PRINT#-2,"*****************
***********"
2640 PRINT#-2,"* CFRR PROGRAM, W
. BONNELL *"
2650 PRINT#-2,"*    3/24/1983 CO
PYRIGHT    *"
2660 PRINT#-2,"*****************
***********"
2670 PRINT#-2:PRINT#-2
2680 PRINT#-2,    "PROJECT LIFE="
OP"YEARS"
2690 PRINT#-2,"DEPRECIATION LIFE
="OD"YEARS"
2700 PRINT#-2,"TAX RATE="TX*100"
%"
2710 PRINT#-2,"INVESTMENT TAX CR
EDIT="TC*100"%"
2720 PRINT#-2
2730 PRINT #-2,"YEAR       ";
2740 PRINT#-2,USING "%         %
";"  EXPENSE";"  SAVINGS";"  CAP
ITAL";"DPR. FLOW";"CASH FLOW"
2750 FOR I=1 TO PL
2760 PRINT#-2,USING "##     ";I;
2770 PRINT#-2,USING "$$######.##
";EX(I);SA(I);CA(I);DP(I);CF(I)
2780 NEXT I
2790 PRINT#-2
2800 PRINT#-2,"REQUIRED   PRESEN
T WORTH"
2810 FOR I=1 TO 6
2820 PRINT #-2,USING"   ## %
";RR(I);
2830 PRINT#-2,USING "$$#######.#
# ";PW(I)
2840 NEXT I
2850 PRINT #-2
2860 PRINT #-2,"CFRR="R"%"
2870 RETURN
```

VIZIDRAW 1.0


X= 411.0 Y= 325.5
Undo
Alphanumerics
Eraser
Pencil
Horiz/Vert Lines
Diag Lines
Rectangles
Circles
Arcs
Area Fill
Magnify
Get
Put
Brush Duplicate
Get Area Manipulation
Black Pen
White Pen
Colorset grn/wt
Clear Screen
Options Menu
Save Image
Load Image
Printer Dump
Move Page
Left
Right
Up
Down
Library Swap
Font Select
Current Fill Pattern
Available Fill Patterns
Patterns Modifiable
Save/Load Patterns
Random Fill

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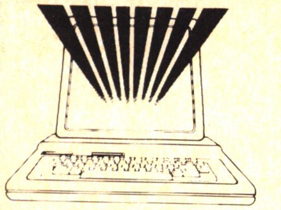

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The Color Computer Supercharger

- A big 52 character by 24 line screen
- 'PRINT @' is fully implemented on the big screen
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- Auto-key repeat for greater keyboard convenience
- The 'ON ERROR GOTO' statement is fully implemented
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Super Screen comes with complete, well detailed instructions and is available on cassette or disc. It adjusts automatically to any 16K or greater, Extended or Disc basic Color Computer or TDP-100 and uses only 2K of memory in addition to the screen memory reserved during power up. Guaranteed to be the most frequently used program in your software library...once you use it, you won't be without it!

Hot CoCo, Jan. '84 *"Super Screen represents a quality utility program that fills a definite need for the serious CoCo user. No other programs on the market so far have offered the error-trapping utility of Super Screen."*

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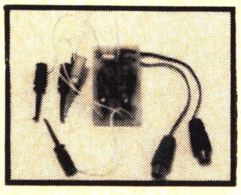

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Rainbow, Feb. '84 *"If you are looking for a program to keep track of your sales and print invoices, then this one will take care of those needs quite well...A good program that would serve the invoicing needs of a small company quite nicely."*

The Mark Data Product sales order processing system provides a fast, efficient means to enter orders, print shipping papers and invoices, prepare sales reports, and monitor receivables. The system automatically enhances the monitor screen to a 51 character by 24 line display. 32K of memory is required along with an 80-column printer and one or more disc drives.

The MDP Order Entry System is a family of programs which operate interactively by means of a "menu" selection scheme. Up to 900 products may be defined and a single disc system can hold over 600 transactions. When the operator selects a task to be performed, the computer loads a program designed to handle that task from the system disc. The system disc contains all of the programs required to create, update and maintain data files and prepare the necessary paperwork including shipping and invoice forms, daily sales reports, a monthly (or other period) sales report and a receivables report.

This order entry software equals or exceeds higher priced packages for other computers and includes a detailed operating manual. **ONLY $99.95**

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* Computers produced after approximately October 1982 require an additional keyboard plug adapter. Please add $4.95.

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Rainbow, May '84 *"Considering what it can do to organize a small business, it is quite a value."*

Hot CoCo, June '84 *"...a serious, professional accounting program and well worth its price. The programs are complete and simple to use."*

The Mark Data Products Accounting System is ideal for the small businessman needing a fast, efficient means to process income and expenses, prepare detailed reports and maintain most of the information required at tax time. The system is a family of programs which operate by means of a "menu" selection scheme. When the operator selects a task to perform, the computer loads a program designed to handle that task from the system disc. The system disc contains all of the programs required to create, update and maintain data files and prepare the necessary accounting reports including a transaction journal, a P & L or income report, an interim or trial balance and a balance sheet.

Up to 255 separate accounts may be defined and a single disc system can hold over 1,400 transactions. This system automatically enhances the monitor screen to a 51 character by 24 line display. 32K of memory is required along with an 80-column printer and one or more disc drives.

This accounting software equals or exceeds higher priced packages for other computers and includes a detailed operating manual.

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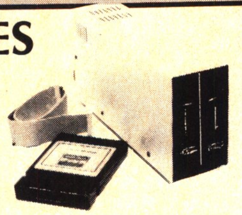

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It's a great new way to learn typing skills! **Cassette $24.95** **Disc $27.95**

The combination of exciting game-play action and colorful, hi-res graphics in Zookey make it an outstanding typing tutor. Speed and skill levels are fully adjustable to train the beginner or challenge the most experienced typist.

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Mark Data Products **SUPER BUG** is a powerful, relocatable machine code monitor program for your CoCo. If you are a beginner, the program and documentation are an indispensable training aid, helping you to gain a better understanding of your Color Computer and machine code programming. If you are an accomplished computerist, **SUPER BUG'S** capabilities, versatility and convenience will prove invaluable during programming and debugging.

SUPER BUG offers so many outstanding features that we are unable to list them all in this limited space but here are a few: hex and alpha numeric memory display, modify, search, and test; full printer support with baud rate and line feed select; up to 220 breakpoints; mini object code disassembler; 64K mode setup; decimal, hex and asci code conversion routines and extensive documentation.

Tape $29.95 **Disc $32.95**

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Over 300 pages of detailed information...an indispensable introduction to your Color Computer, complete with diagrams, photographs, and a BASIC thesaurus and command reference section. A CoCo encyclopedia. **$16.95**

"Programming the 6809" by Rodney Zaks

One of the best machine language texts available—required reference material. This book explains how to program the 6809 in machine language, covering all aspects progressively and systematically. **$15.95**

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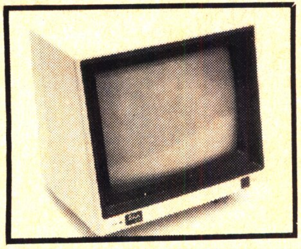
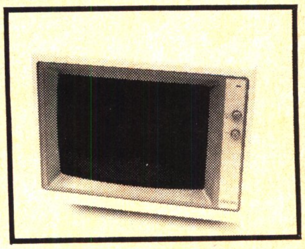


SAKATA COLOR SC-100- $269.95

The SC-100 is a streamlined 13" composite monitor which produces sharp, brilliant colors. The cabinet is made of durable styrene and is available in an attractive off-white color. Includes audio with speaker and earphone jack. We highly recommend this color monitor because of its excellent performance and beautiful styling.



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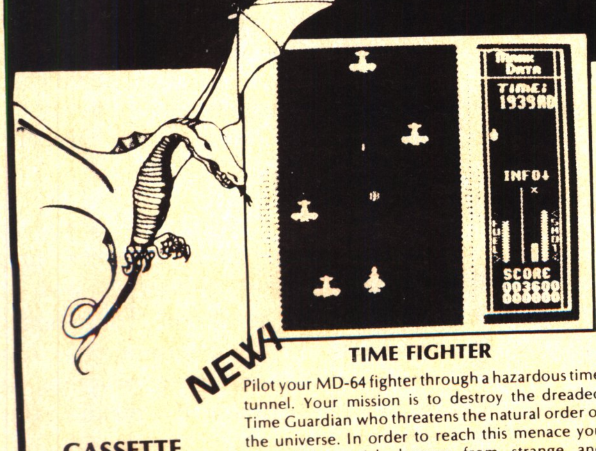

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Rainbow, March '84 *"One of the best in your library of computer games. It's a real gem."*

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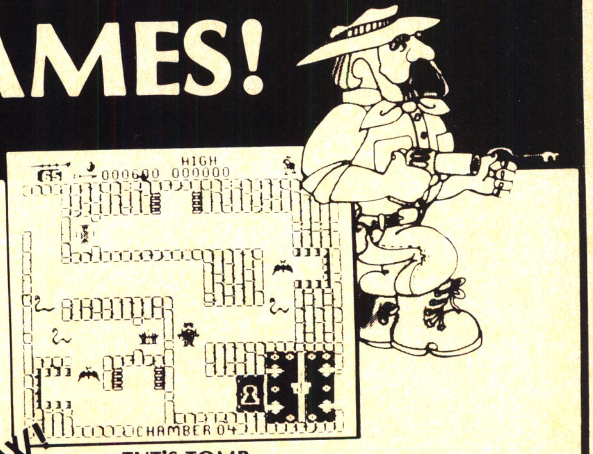

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Hot CoCo, April '84 *"State of the art CoCo graphics. A first rate game."*

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Mark Data Products

PROJECT MANAGER

32K
Disk

In making the most of your time, this program could be the solution

PERT: Project Evaluation and Review Technique

By Jorge Mir

Having the ability to evaluate and review projects can be very useful, at the office as well as at home, especially when time is of the essence and you want to make sure that projects are completed on time with a minimum of supervision.

There are many types of "PERT" programs available on the market. Some of these are quite sophisticated (and expensive) and require a large mainframe in which to operate. The *PERT* version I have developed for the Color Computer is a simple one, yet it has sufficient "bells and whistles" to make it quite beneficial at work.

Following are the main features of the *PERT* program:

1) Calculates minimum time needed to complete project.
2) Calculates probability of completion by a target date.
3) Determines whether activities are critical or non-critical.
4) Calculates expected duration and standard deviation for each activity.
5) Determines early and late start and finish times.
6) Calculates slack time for each activity (if any).

In addition, several output reports are available:

1) Worksheet for developing a precedence table.
2) Complete activity schedule.
3) Activity schedule by responsibility.
4) Complete Gantt type schedule.
5) Gantt schedule by responsibility.

The activity and Gantt schedules both clearly indicate the "critical" activities so the user can concentrate on evaluating those activities, as well as monitoring progress, as the project advances through the various stages of completion.

The program is fully prompted for all input data, so these will not be covered in detail. The input and output routines send data to a disk. If you have a cassette system, you will have to change those routines so data is saved to cassettes instead of disks. Also, a printer is necessary for the various output reports.

Please note that a total of 100 activities is the maximum established by the program. This limitation can be changed by changing the `DIM` statements at the beginning of the program.

In order to properly enter all data, a precedence table (which activity comes before another activity) is necessary. After you enter all of the activities, you will be able to develop a worksheet for this purpose. After you have the worksheet completed, you can then run the program in its entirety.

Here are some hints for properly completing the worksheet:

A "node" can be viewed as a stage in the project. That is, at which stage an activity must commence and at which stage it must end. These nodes serve as the key for determining the rest of the calculations in the program, so care should be exercised in planning this aspect of the project.

The start node of each activity must appear as the end node of some other activity in the project. In other words, all activities must be linked with each other (exceptions are those activities

---

(Jorge Mir is a certified public accountant and controller of a Fortune 500 Corporation. He publishes most of his original work through THE RAINBOW.*)*

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2. CRYSTAL CASTLES
3. PENGON
4. GALAGON
5. QIKS
6. CUBIX
7. MS. GOBBLER
8. *BUZZARD BAIT*
9. DEVIOUS
10. *BLOKHEAD*

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with a node of '1', meaning they are to be performed first and no other activity precedes it).

More than one activity can have the same start or end nodes; just make sure the beginning node of an activity coincides with the ending node of the activity that must precede it. Here is a simple example (cooking a meal):

	Start Node	End Node
Buy all ingredients	1	2
Marinate meat	2	3
Wash vegetables	2	4
Bake potatoes	3	5
Broil meat	3	6
Cook vegetables	4	6
Serve meal	6	7

In the example, you cannot broil the meat (start node 3) until the meat is marinated (end node 3). Also, this project may require two people since there are two activities starting at the same node (i.e., one marinating the meat and the other washing the vegetables).

If there is a start node which does not coincide with an ending node in one of the other activities, the program will stop execution and inform you of those activities for which starting nodes must be changed.

The best way to get used to the program is to run some simple examples, as the one noted. That way, you will get a good feel for all the prompts for inputting data and all of the output reports, as well as the various ways in which a program of this nature can be put to good use.

I often get involved in some complex projects at work and have used this program many times to help me keep control of such projects. Take my word for it, it really helps!

160	108	1660	201
320	65	1780	6
480	232	2040	108
940	95	2220	167
1210	24	2370	228
1480	87	2490	71
		END	210

The listing:

```
10 GOTO 2680
20 CLEAR 10000
30 DIM A$(100),R$(100),A(100,2),
S(100),F(100),E(100,2),C(100)
40 DEFFNR(Z1)=INT((Z1*1000+.5))/
1000
50 GOTO 1530
60 GOSUB1540:PRINT"HAVE ACTIVITI
ES ALREADY BEEN     STORED ON DIS
K?"
70 I$=INKEY$:IF I$=""THEN70 ELSE
 IF I$<>"Y" THEN PT=0:GOTO150 EL
SE PT=1
80 GOSUB1540:PRINT"PLACE DISK CO
NTAINING PREVIOUSLYSTORED ACTIVI
TIES IN DRIVE 0 ANDPRESS ANY KEY
 WHEN READY."
90 IF INKEY$=""THEN90 ELSE PRINT
:PRINT"LOADING DATA......"
100 OPEN"I",#1,"PERT.ACT"
110 INPUT#1,PT$
120 IF EOF(1) THEN 140
130 N=N+1:INPUT#1, A$(N),R$(N):G
OTO120
140 CLOSE#1:GOTO250
150 GOSUB 1540:PRINT"TITLE OF TH
IS PROJECT:":LINE INPUT PT$
160 PRINT
170 PRINT"DESCRIBE ACTIVITIES IN
CLUDED IN THIS PROJECT."
180 PRINT"TYPE 'END' WHEN DONE."
:PRINT:A=PEEK(&H88)*256+PEEK(&H8
9)
190 PRINT@A-&H400,"ACTIVITY NO."
;N+1;CHR$(8)":":PRINT:PRINT:PRIN
T:PRINT@A-&H400+32,;:LINE INPUT
A$
200 IF A$="ERROR" THEN N=N-1:GOT
O 190
210 IF A$="END" THEN 250
220 N=N+1
230 I=INSTR(A$,"/"):IF I>0 THEN
A$(N)=LEFT$(A$,I-1):R$(N)=MID$(A
$,I+1) ELSE SOUND100,2:N=N-1:PRI
NT@A-&H400,"ENTER '/' PLUS RESPO
NSIBILITY!":FOR Q=1TO500:NEXTQ:S
OUND100,2:GOTO190
240 GOTO 190
250 GOSUB 1540:PRINT"DO YOU WANT
 TO PREPARE WORSHEET TO DEVELOP
A PRECEDENCE TABLE?"
260 I$=INKEY$:IF I$=""THEN 260
270 IF I$<>"Y" THEN 520
280 IF PT=1 THEN PT=0:GOTO380
290 GOSUB 1540:PRINT"DATA MUST B
E STORED BEFORE WE   PROCEED."
300 PRINT:PRINT"PRESS ANY KEY WH
EN YOU HAVE A   DISK READY FOR S
TORING DATA."
310 IF INKEY$=""THEN310
320 OPEN"O",#1,"PERT.ACT"
330 WRITE#1,PT$
340 FOR X=1TON
350 WRITE#1,A$(X),R$(X)
360 NEXT X
370 CLOSE#1
380 GOSUB 1540
390 PRINT"PLEASE GET PRINTER REA
DY FOR     PRINTING ACTIVITY WORK
SHEET."
400 PRINT:PRINT"PRESS ANY KEY WH
EN READY."
410 IF INKEY$=""THEN 410
420 PRINT#-2,"PROJECT:  "PT$
430 PRINT#-2:PRINT#-2
440 PRINT#-2,"
                            NODES
```

```
             TIMES"
450 PRINT#-2,"
                        --------
---     -----------------"
460 PRINT#-2,"           ACTIVIT
IES                     START   E
ND      BEST   PAR   WORST"
470 PRINT#-2,"------------------
--------------------   -----   -
---     ----   ----   -----"
480 FOR X=1TO N
490 PRINT#-2:PRINT#-2,USING"###
- %
  %    ----    ----     ----   ---
-   ----";X,A$(X)
500 NEXT X
510 PT$="":GOTO 1530
520 '***  ENTER DATA   ***
530 FOR I=1 TO N
540 IF A(I,1)>0 THEN 800
550 GOSUB1540
560 PRINT A$(I):PRINT
570 PRINT"START NODE";
580 INPUT A(I,1)
590 IF A(I,1)<0 THEN I=I+A(I,1):
GOTO550
600 PRINT"END NODE";
610 INPUT A(I,2)
620 IFA(I,2)>=A(I,1) THEN 680
630 IF A(I,2)<N THEN 680
640 PRINT" START NODE MUST BE NU
MBERED     LOWER THAN END NODE,
AND END    NODE MUST BE LESS THA
N NUMBER   OF ACTIVITIES."
650 PRINT" *** TRY AGAIN   ***"
660 PRINT
670 GOTO 550
680 PRINT"ENTER THREE TIME ESTIM
ATES FOR  THIS ACTIVITY:"
690 PRINT"   OPTIMISTIC TIME:";
700 INPUT A1
710 PRINT"      EXPECTED TIME:";
720 INPUT M
730 PRINT"  PESSIMISTIC TIME:";
740 INPUT B
750 E(I,1)=FNR((A1+M*4+B)/6)
760 E(I,2)=FNR((B-A1)/6)^2
770 S(I)=0
780 F(I)=0
790 IF FLAG=1 THEN FLAG=0:RETURN
800 NEXT I
810 FOR I=1 TO N
820 IF S(A(I,2))>=S(A(I,1))+E(I,
1) THEN 840
830 S(A(I,2))=S(A(I,1))+E(I,1)
840 NEXT I
850 F(A(N,2))=S(A(N,2))
860 FOR I = N TO 1 STEP -1
870 IF F(A(I,1))=0 THEN 900
880 IF F(A(I,1))>F(A(I,2))-E(I,1
) THEN 900
890 GOTO 930
900 IF F(A(I,2)) < S(A(I,1))+E(I
,1) THEN F(A(I,2))=S(A(I,1))+E(I
,1)
910 Q=F(A(I,2))-E(I,1):IF Q=>0 T
HEN F(A(I,1))=Q
920 IF F(A(I,1))=0 THEN F(A(I,1)
)=S(A(I,1))
930 NEXT I:GOTO 1430
940 V=0:U$="%                   %
 - ###.###"
950 C=0
960 L=0
970 FOR I= 1 TO N:CLS
980 S1=F(A(I,2))-S(A(I,1))-E(I,1
):IF INT(S1)=<0 THEN C(I)=0 ELSE
 C(I)=S1
990 CLS:IF LEN(PT$)=>32 THEN PRI
NT PT$ ELSE PRINT TAB((32-LEN(PT
$))/2)PT$
1000 PRINT STRING$(32,131);
1010 PRINT A$(I):PRINT
1020 PRINT"FROM NODE";A(I,1)"TO
NODE";A(I,2)
1030 PRINT "(A ";
1040 IF C(I)=0 THEN 1060
```

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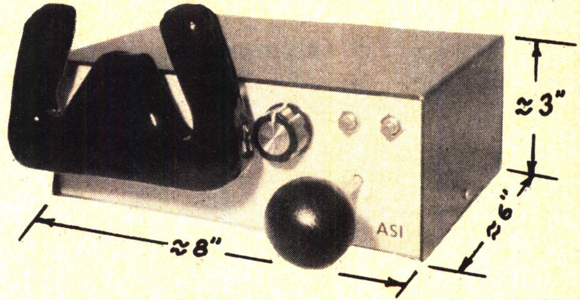

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- Complete manuals accompany the systems.
- User-friendly menus make them easy to use.

System Requirements

- 64K memory
- Dual Disk Drives (Payroll requires double-sided drives)

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This is a comprehensive double entry accounting system with complete audit trails, closing procedures, and full reporting. The chart of accounts is flexible and the system easy to use. Reports include the General Ledger, Trial Balance, Balance Sheet, Income Statement, and Transaction Register. Your financial information is at your finger tips! **$125.00**

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This is the most comprehensive payroll you'll find on a microcomputer. Besides collecting key employee information, it allows entry of pay rates for standard hours, overtime, and salary. Hourly, salary, and commissioned employees may be paid weekly, bi-weekly, semi-monthly, and monthly. Two types of special monthly deductions are also accommodated. Year-to-date, quarterly, monthly and current totals are maintained. All federal reporting is done automatically and your state computations are also included. **$175.00**

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This system can give you the tools to plan your business' growth by controlling expenditures and forecasting cash requirements. It helps a small business manage and track its cash liabilities by collecting vendor invoice information and reporting the business' cash commitments and payment history. Along with standard payables reports it also includes a check writer and payment forecast reports. **$125.00**

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All businesses need to know who owes them money! This system provides reliable and timely information regarding the status of all customer accounts. You can know instantly which accounts are past due, forecast how much money to expect to receive for cash flow planning, and keep on top of your customers' credit positions. Customer name, address, credit limit, invoice, and payment information is recorded and reports of all information including customer statements are available upon your request. **$125.00**

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32K disk **$27.95**

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NEW

DATA BANK

for OS-9 and other 64K users

If you want a data base that does it YOUR WAY, then DATA BANK is the data management system for you! With DATA BANK, you are the boss. You define your own display screens, record formats, calculated fields, sort sequences, selection criteria, and report formats. Even with all its power, Data Bank is very easy to use! It goes several steps beyond the average data base by adding features like calculated fields, three level sorts, easy interface with DynaCalc, and special file manipulation utilities.

STORING YOUR DATA - the way YOU want to see it!

Remember, with Data Bank you determine how your information is stored and displayed. You can design up to 9 different screen formats for display, making data entry and retrieval simple. Each record can contain up to 512 characters in up to 35 fields, ample for nearly every application. Data types include alphanumeric (for strings of all kinds), math (for real numbers), date, and "derived" (values calculated by your own defined formulas)! These derived formulas can use values from other fields and mathematical functions. There isn't anything you can't store with these formats! The size of your data base is limited only by your disk space; and you can maintain multiple data bases on the same disk. Expansion of record files is made very easy with sophisticated file manipulation utilities. You can also transfer data between files - all records or selected subfiles, which is handy for revising record layouts!

SORTS & SELECTIONS - organizing your data

To aid in sorting and selecting, you can define up to 9 different "access keys," each with up to 3 levels. These access keys are used for accessing a specific record, sorting an entire file, or selecting subsets of files. The generic search will find any occurrence of a given value in a key field throughout the data base. Using logical operators (less than, greater than, equal, or, and) you can select any subset of your data base for printing. All or any selected subset of records can be sorted in order. You can organize your data in any way you can think of!

REPORTING - all the right stuff!

Printing your information in a format useful to you is the most important function of a data base system. Data Bank allows you to design customized reports to fit your individual needs and can save up to 9 defined formats for repeated use. You may include page headings with titles, automatic page numbers, column headings, totals for numeric fields, and more. Reports will print to the output path you specify and use any of your pre-defined access keys.

SPECIAL FEATURES

Data Bank offers even more with:

- Access to all OS-9 commands from the program.
- Reads DynaCalc OS-9 files.
- Easy access to user programs.
- OS-9 not required

64K Disk $79.95

FLEXI-FILER™

This is the most comprehensive and flexible data management system available. It is easy to use and very powerful. (Requires 32K disk & RSDOS.)

Collect up to *35 fields* per record, with up to *240 characters per record*. You designate the name of each field, its position, and its format, (alphanumeric, numeric, money, date or exponential). The size of your *data base is unlimited* - only your disk space will limit your files.

Organize your way. You determine how the information is displayed and stored by *designing your own entry screens*. Your format can be changed any time. Easy screen definition makes data entry simple. The quick *assembly language keyboard* routine insures that you can't type faster than Flexi Filer!

Select, using logical operators (less than, greater than, equal, and, or) *any subset* of your data base with up to *36 different criteria*. A *generic search* feature finds any occurrence of a given string in the key field throughout the data base!

Sort all or any selected subset of records in ascending or descending order by any of your 35 fields with a very *FAST assembly language sort!*

Design ***customized reports*** and labels to fit your individual needs, including page headings with titles, automatic page numbers, and column headers. Store up to 10 often-used formats. Numeric fields can be totaled automatically for summaries. Printing your information in the format most useful to you is a snap! And you can *set the baud rate* for faster printers too. Reports will print to the printer or screen.

A File Manager with sophisticated file manipulation is the sign of a true data base manager. With Flexi Filer you can *archive and/or delete records via selected sub-files*. (For example, archive records with an old date into a separate file and delete them from your working data disk. This frees up disk space without losing important data.) You can also *transfer data between files* - all records or selected sub-files. This is handy for adding fields to old database layouts or revising records without re-entering data! Also included is *password* protection, *automatic expansion* of record files, and easy access to *user programs.*

Disk $54.95

Canadian Dealer Distributor: Kelly Software
P.O. Box 11932 Edmonton, Alberta T5J3L1

MERGE 'N MAIL

Merge 'n Mail was specially designed to do one job and do it very well - maintain, merge, and print mail list information. Mail 'n Merge is perfect for clubs, Christmas card lists, newsletter writers, party givers, or anyone with a personal address file for relatives, doctors, insurance agents, emergency numbers . . . !

A lot of information is stored. The eight preset fields include Last Name, First Name, Company Name, Address, City, State, Zip-Code, and Phone Number. Twelve additional programmable fields allow you to store extra information according to your personal needs. Names are automatically sorted by last name when entered, so no special sort is needed. A zip-code sort is also available. Merge 'n Mail can store over 2500 records per file; over 800 is possible on a single drive; the files may be on 1-4 drives.

Look-up is easy and fast. Logical selection allows you to search for records by any field with six different qualifiers. The binary search algorithm makes access very fast. The unique "soundex search" feature lets you look for a name without knowing how to spell it correctly - just type what it sounds like!

Printing is a snap! Label formats are easy to specify at print time or your own custom label formats may also be saved and loaded from disk. Labels and listings may be sorted by name or zip-code. The logical selection feature allows you to specify a subset of your mailing list by any field with six different qualifiers for printing. Printer baud rate, compression and uncompression codes may be changed and saved to disk to tailor it to your personal printer.

The mail-merge feature is especially useful. You can create letters with your word processor and embed mailing list info automatically! It can be used with any ASCII editor including Scribe, Telewriter, Scripsit, and Super Color Writer II.

Mail 'n Merge is sophisticated yet easy to use. If you maintain a mailing list for any purpose, this is a tool that can save you time! It requires 64K and one disk drive and sells for a very reasonable price

64K disk $27.95

DON'T FORGET!

Personal Time Management System
and Event Recorder with Memos

You won't forget **Don't Forget!** You'll actually enjoy getting organized with this personal time management systems. The Macintosh-like icons make entering your personal schedule simple and fun. But if you need instructions, there are help screens to assist you.

You'll never miss a birthday or important appointment again! With **Don't Forget!** you can record the entire year's occasions and daily appointments ahead. Each day has spaces for 4 Special Occasions, 2 Memos, and hourly notes for 6 am through 9 pm. The built-in 51 × 24 upper and lower case hi-res display makes it very easy to read. You can display or print any daily schedule - or a whole week at a time - so you'll remember every important event. You can even print a blank monthly calendar page with big boxes to scribble notes in!

So use your CoCo's memory and **Don't Forget!** as your personal secretary. Designed for mouse, joystick, or keyboard entry. **Don't Forget!** requires 32K and one disk drive. **Disk $27.95**

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```
1050 PRINT"NON-";
1060 PRINT"CRITICAL EVENT)":PRIN
T
1070 PRINTUSING U$;"EXPECTED DUR
ATION",E(I,1):PRINTUSINGU$;"STD.
 DEVIATION",SQR(E(I,2))
1080 IF INT(S1)>0 THEN 1150
1090 PRINTUSINGU$;"START NO LATE
R THAN",S(A(I,1))
1100 PRINTUSING U$;"MUST COMPLET
E BY",F(A(I,2))
1110 IF L>=F(A(I,2)) THEN 1130
1120 L=F(A(I,2))
1130 V=V+E(I,2)
1140 GOTO 1190
1150 PRINTUSING U$;"EARLY START"
,S(A(I,1)):PRINT USINGU$;"LATE S
TART",F(A(I,2))-E(I,1)
1160 PRINT USING U$;"EARLY FINIS
H",S(A(I,1))+E(I,1)
1170 PRINTUSINGU$;"LATE FINISH",
F(A(I,2))
1180 PRINT USING U$;"SLACK TIME"
,S1
1190 PRINT@448,STRING$(32,140);:
PRINT@484,"PRESS ANY KEY TO CONT
INUE";
1200 I$=INKEY$:IF I$=""THEN1200
1210 IF I$=CHR$(13) THEN 1530
1220 NEXT I
1230 GOSUB1540
1240 PRINT"THE CRITICAL PATH LEN
GTH IS:    ";L
1250 P=SQR(V)
1260 PRINT"PLUS OR MINUS";:PRINT
 USING" #.##";P
1270 PRINT"ENTER DESIRED COMPLET
ION TIME    (0 TO END)";
1280 INPUT D
1290 IF D<=0 THEN 1530
1300 Y=(D-L)/P
1310 R=EXP(-(Y^2)/2)/2.506628274
6
1320 Z=Y
1330 Y=1/(1+.33267*ABS(Y))
1340 T=1-R*(.4361836*Y-.1201676*
Y^2+.937298*Y^3)
1350 IF Z>=0 THEN 1370
1360 T=1-T
1370 GOSUB1540
1380 PRINT
1390 PRINT USING "PROBABILITY OF
 COMPLETION WITH  DURATION OF ##
# IS ##.##";D,T
1400 PRINT
1410 GOTO 1270
1420 CLS:END
1430 PRINT:PRINT" EDITING STARTI
NG TIMES....."
1440 FOR I = 1 TO N
1450 IF S(A(I,1))>0 THEN 1490
1460 IF A(I,1)=1 THEN 1490
1470 IF XX=0 THEN GOSUB1540:PRIN
T"THESE ITEMS NEED EDITING:":XX=
1
1480 PRINT " ";A$(I)
1490 NEXT I:XX=0
1500 PRINT@480,"  <PRESS ANY KEY
 TO CONTINUE>";
1510 IF INKEY$=""THEN1510
1520 GOTO 1530
1530 GOSUB 1540:GOTO1560
1540 CLS:PRINT TAB(10)"* P E R T
 *"
1550 PRINT" (PROJECT EVALUATION
& REVIEW)":PRINT STRING$(32,131)
:RETURN
1560 PRINT:T=5
1570 PRINT TAB(T)"1 - ENTER NEW
PROJECT"
1580 PRINTTAB(T)"2 - LOAD OLD PR
OJECT"
1590 PRINTTAB(T)"3 - SAVE DATA"
1600 PRINTTAB(T)"4 - EVALUATE PR
OJECT"
1610 PRINTTAB(T)"5 - PRINT RESUL
TS"
```

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```
1620 PRINTTAB(T)"6 - PRINT GANTT
 CHART"
1630 PRINTTAB(T)"7 - END PROGRAM
1640 PRINT@448,STRING$(32,140);:
PRINT TAB(9)"YOUR CHOICE?";:SOUN
D100,1
1650 I$=INKEY$:IF I$=""THEN1650
1660 I=VAL(I$):IF I<0 OR I>7 THE
N SOUND100,1:GOTO1650
1670 ON I GOTO 1830,1890,2020,21
00,2280,2460
1680 GOSUB1540:PRINT" DO YOU WAN
T TO PREPARE A WORK-  SHEET AT T
HIS TIME?"
1690 I$=INKEY$:IF I$=""THEN1690
1700 IF I$<>"Y"THEN CLS:END
1710 PRINT:INPUT" RESPONSIBILITY
";K$
1720 GOSUB 2650
1730 U$="  %
           %  %         %   ###
  ###    ###    "+STRING$(8,95)+
"   "+STRING$(8,95)
1740 PRINT#-2,CHR$(30);"  PROJEC
T: "PT$:PRINT#-2,"           (WO
RKSHEET FOR RECORDING TIME ESTIM
ATES)";CHR$(13);CHR$(13);CHR$(28
)
1750 PRINT#-2,"             STEP
S                   RESPONS.
  BEG   END   TIME      FROM
   TO"
1760 PRINT#-2,"   --------------
---------------     ---------
  ---   ---    ---    --------
 ---------"
1770 FOR I = 1 TO N
1780 IF INSTR(R$(I),K$)=0THEN181
0
1790 PRINT#-2,USING U$;A$(I),R$(
I),A(I,1),A(I,2),E(I,1)
1800 IF INT(I/58)=I/58 THEN PRIN
T#-2,CHR$(12)
1810 NEXT I:PRINT#-2,CHR$(12)
1820 GOTO 1530
1830 IF PT$=""THEN 60
1840 GOSUB1540:PRINT"PROJECT CUR
RENTLY IN MEMORY:":PRINT PT$
1850 PRINT:PRINT"DO YOU WANT TO
ADD TO IT?"
1860 I$=INKEY$:IF I$=""THEN1860
1870 IF I$="Y" THEN GOSUB1540:GO
TO170
1880 N=0:GOTO150
1890 GOSUB1540
1900 LINEINPUT"FILE NAME:  ";F$
1910 IF F$="?" THEN DIR:GOTO1900
1920 IF F$="" THEN 1530
1930 PRINT:PRINT" PROJECT BEING
LOADED:"
1940 OPEN"I",#1,F$
1950 X=0
1960 INPUT#1,PT$,Y:N=N+Y
1970 PRINT" ";PT$
1980 IF EOF(1)THEN 2010 ELSE X=X
+1
1990 INPUT#1,A$(X),R$(X),A(X,1),
A(X,2),S(X),F(X),E(X,1),E(X,2),C
(X)
2000 GOTO 1980
2010 CLOSE#1:GOTO1530
2020 GOSUB1540
2030 LINEINPUT"FILE NAME:  ";F$
2040 OPEN"O",#1,F$
2050 WRITE#1, PT$,N
2060 FOR X=1 TO N
2070 WRITE#1,A$(X),R$(X),A(X,1),
A(X,2),S(X),F(X),E(X,1),E(X,2),C
(X)
2080 NEXT X
2090 CLOSE#1:GOTO1530
2100 GOSUB1540
2110 PRINT"  DO YOU WANT TO CHAN
GE ANY OF    THE DATA BEFORE EVA
LUATING      THIS PROJECT?"
2120 I$=INKEY$:IF I$=""THEN2120
2130 IF I$="N" THEN 940
2140 IF I$<>"Y" THEN 2120
2150 PRINT:LINEINPUT"  KEYWORD:
";K$
2160 U$="%                     %
 ###":FOR X=1TON
2170 IF INSTR(A$(X),K$)=0 THEN 2
250
2180 GOSUB1540
```

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COMPUTER ISLAND

MATH

THE MONEY SERIES
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16K EB. $17.95
A multi-level 'Space Invaders' type game to reinforce the 4 basic math operations (addition, subtraction, multiplication and division). Problems become more difficult as you progress. Hi-res. graphics, joystick required.
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SCIENCE

SCIENCE GAME $29.95
by J. Keeling 32K EB. Disk Only
Over 600 questions in 9 categories. Makes learning science facts fun. Game format, 1 or 2 players, teams. Grade 8 and up.

BEYOND WORDS 32K ECB $19.95 Each
These Language Arts programs cover common misspellings, and synonyms/antonyms on each level. Additionally, Level 1 tests contractions and abbreviations, Level 2 tests homonyms, and Level 3 tests analogies. Each program has 3 parts and contains over 400 questions and uses over 800 words. All tests are grade appropriate. User modifiable (directions included). Printer option.

Level 1 Grades 3-5
Level 2 Grades 6-8
Level 3 Grades 9-12
DISK VERSION Each $23.95

THE MATH TUTOR SERIES 16K Ext.
These tutorials take the child through each step of the example. All programs include HELP tables, cursor and graphic aids. All allow user to create the example, or let the computer choose. Multi-level. Great teaching programs. By Ed Guy.

LONG DIVISION TUTOR	**$14.95**
MULTIPLICATION TUTOR	**$14.95**
FACTORS TUTOR	**$19.95**
FRACTIONS TUTOR (Addition)	**$19.95**
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Any 2 FRACTIONS programs	**$29.95**

TRIGONOMETRY TUTOR 32K
By Ed Guy $24.95
A step by step tutorial for learning to compute the sides and angles of right triangles. All examples have graphic representation.

GRAPH TUTOR 32K ECB $19.95
Line, bar, pie and pictographs are demonstrated. Learn to read and use these graphs. Test mode, Hi-res graphics throughout. By Chris Phillips.

CROCODILE MATH 16K Ext.
By Art Provost $17.95
An animated math game using hi-res graphics. A fish containing a problem moves toward a crocodile containing a possible answer. If the answer is true, open the crocodile's mouth with the joystick to eat the fish. If false, keep his mouth closed. Addition, subtraction, and multiplication examples on 3 levels, 3 speeds. Tape only.

Preschool

PRESCHOOL SERIES $11.95 EA.
Pre. 1 - 2 programs for number recognition and counting.
Pre. 2 - 2 programs for simple addition, number game.
Pre. 3 - Alphabet recognition.
All 16K E.B. By J. Kolar

FIRST GAMES by Penny Bryan
32K EB. tape $24.95 disk $27.95
First Games contains 6 menu-driven programs to delight and teach your early learners (ages 3-6). These games enrich the learning of colors, numbers, lowercase letters, shapes, memory, visual discrimination and counting.

STATES & CAPITALS $19.95
Multiple choice quiz on a hi-res screen. 32K E.B.

EXPLORERS & SETTLERS $19.95
Hi-res screen. Multiple choice quiz on explorers and settlers of the new world. 32K

ARROW GAMES by Penny Bryan
32K EB. tape $21.95 disk $24.95
Six menu driven games for young children (ages 3-6) to teach directions. All games involve using the arrow keys. Games include LADYBUG, BUTTERFLY, ARROW MATCH, KALEIDOSCOPE, RABBIT, and DOODLE. Colorful graphics.

MR. COCOHEAD 16K E.B. $16.95
Create over 10,000 funny faces. Facial features controlled through keyboard. Surprise command. Ages 4 and up.

Social Studies

KNOW YOUR STATES $19.95 32K
Shows each state to identify on hi-res screen. Help command and scoring. By J. Keeling

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Language Arts

(ALL PROGRAMS IN 16-K EXTENDED EXCEPT WHERE NOTED)

CONTEXT CLUES - by Steve Blyn - Multiple choice reading programs. Specify grade 4,5,6 or 7. each $17.95

VOCABULARY BUILDERS - 32K - Great for test preparations. 200 questions, multiple choice, modifiable, printer option. I (grades 3-5), II (6-8) or III (9-12) each $19.95

READING AIDS 4-PAK - Child creates own reading material. $19.95

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32K EB $19.95 TAPE ONLY
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32K EB Disk or 16K EB Tape

Educational Software

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THE QUIZ MAKER by David Stanley
32K EB. tape $24.95 disk $27.95
A program that enables a teacher to create tests or a student to study for tests in any subject area. Your questions and answers may be saved for future use. Short answer, true-false, fill-in and other quiz formats are supported. Printer option for hard copy test generation. Program randomizes questions, keeps track of score and provides a variety of testing formats.

ARITHMETIC TUTOR DIAGOSTIC
FRACTIONS TUTOR DIAGNOSTIC
32K DISK $49.95 each
More of the MATH TUTOR SERIES. A diagnostic feature permits teachers to keep records of students' progress on the disk using a password. Printer option generates hard copy of progress reports. ARITHMETIC TUTOR covers multiplication, division, factoring, and order of operations. FRACTIONS TUTOR covers addition subtraction, multiplication, and division of fractions. Easy to operate. Disk only. By Ed Guy.

COLORGRADE 32K ECB $29.95
A great aid to teachers. Records and calculates grades for up to 6 classes of up to 40 students each. Uses number or letter grades, named or numerical periods and gives a weighted average. Easy to use. Full directions. DISK ONLY. By David Lengyel.

COMPUTER LITERACY
by Steve Blyn
32K E.B. $19.95
A computer literacy quiz exclusively for the Color Computer. Tests and scores from over 60 questions on a HI-RES upper and lower case screen. Reviews computer literacy and beginning programming knowledge. Ages 10 and up.

INNER CITY 32K EB
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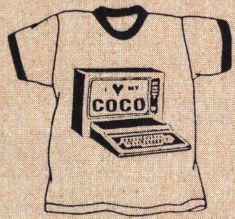

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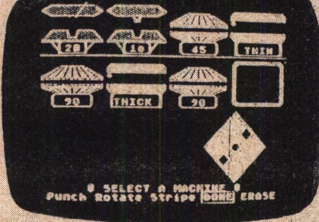

The Factory: FROM SUNBURST
Strategies in Problem Solving

Grades 4-adult. Winner 1983 Learning Software Award. Recommended in Classroom Computer Learning, Courseware Report Card and Electronic Learning. Unique three-level program challenges students to create geometric "products" on a simulated machine assembly line which the student designs. Diskette for 32K TRS-80 Color Computer with Extended Color BASIC. $39.95

The Pond: FROM SUNBURST
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TRS-80 Color Computer. TDP System 100.

```
2190 PRINT A$(X):PRINT
2200 PRINT USING U$;" START NODE
",A(X,1):PRINT USING U$;" END NO
DE",A(X,2)
2210 PRINT USING U$;" EXPECTED D
URATION";E(X,1):PRINT USING U$;"
 VARIANCE";E(X,2)
2220 PRINT:PRINT" CORRECT RECORD
?":PRINT @480,"     (PRESS <ENTE
R> TO END)";
2230 I$=INKEY$:IF I$=""THEN2230
2240 IF I$="Y" THEN I=X:FLAG=1:G
OSUB 550
2250 IF I$=CHR$(13) OR X=N THEN
GOSUB 1540:PRINT:PRINT" CLEARING
 REGISTERS......":FOR X=1TON:F(X
)=0:S(X)=0:NEXTX:PRINT:PRINT" RE
COMPUTING START/END TIMES...":GO
TO810
2260 NEXT X
2270 FLAG=0:GOTO1530
2280 GOSUB1540:PRINT:INPUT"RESPO
NSIBILITY";K$
2290 TIME=0
2300 GOSUB2650
2310 V=0:C=0:L=0
2320 PRINT#-2,CHR$(30);"   PROJE
CT: "PT$:PRINT#-2
2330 PRINT#-2,CHR$(29);"

          ----NODES----    EXP.
    -START TIME-     --END TIME-
-     SLACK"
2340 PRINT#-2,"
   STEPS                RESP.
 START     END    TIME      EARLY
    LATE    EARLY    LATE     TIM
E "
2350 PRINT#-2,"   --------------
------------------   ----------
 -----   -----    -----    -----
   -----    -----   -----     ---
--"
2360 U$="   %
           %   %        %  #####
   #####    ###.#    ###.#   ###
.#    ###.#   ###.#    ###.#  %
          %
2370 FOR I=1 TO N
2380 IF INSTR(R$(I),K$)=0 THEN 2
430
2390 S1=F(A(I,2))-S(A(I,1))-E(I,
1):IF INT(S1)=<0 THEN C(I)=0 ELS
E C(I)=S1
2400 IF C(I)=0 THEN CR$=CHR$(93)
+"-- PAINTRITICAL" ELSE CR$=""
2410 PRINT#-2, USING U$;A$(I),R$
(I),A(I,1),A(I,2),E(I,1),S(A(I,1
)),F(A(I,2))-E(I,1),S(A(I,1))+E(
I,1),F(A(I,2)),ABS(S1),CR$
2420 TIME=TIME+E(I,1)
2430 NEXT I
2440 PRINT#-2:PRINT#-2:PRINT#-2,
"     TOTAL EXPECTED TIME:";TIME
:PRINT#-2:PRINT#-2
2450 GOTO 1530
2460 GOSUB1540:PRINT:INPUT"RESPO
NSIBILITY";K$
2470 GOSUB2650:PRINT#-2,CHR$(30)
;CHR$(31);:PRINT#-2,TAB((40-LEN(
PT$))/2)PT$
2480 PRINT#-2,CHR$(30);TAB(25)"(
CRITICAL PATH SCHEDULE)"
2490 PRINT#-2:PRINT#-2,"RESPONSI
BILITY: ";:IF K$="" THEN PRINT#-
2,"ALL" ELSE PRINT#-2,K$
2500 PRINT#-2,CHR$(29);TAB(35)"
         10        20        30
       40        50        60
     70        80        90
  100"
2510 TT$="+---------+---------+-
--------+---------+---------+---
------+---------+---------+-----
----+---------+":PRINT#-2,TAB(35
)TT$
2520 FOR I=1TON
2530 IF INSTR(R$(I),K$)=0 THEN 2
630
2540 IF LEFT$(A$(I),1)="*" THEN2
630
2550 PRINT#-2,USING"%
                     %";A$(I);:P
RINT#-2,TAB(35)"!";:PRINT#-2, TA
B(S(A(I,1))+36);
2560 T1=INT(S(A(I,1))+.5):IF C(I
)=0 THEN T=INT(F(A(I,2))-.5):M$=
"C" ELSE T=INT(S(A(I,1))+E(I,1)-
.5):M$="X"
2570 FOR X= T1 TO T
2580 PRINT#-2,M$;
2590 NEXT X
2600 IF C(I)=0 THEN PRINT#-2:GOT
O2630
2610 FOR X=S(A(I,1))+E(I,1)+1 TO
 F(A(I,2))
2620 PRINT#-2,".";:NEXTX:PRINT#-
2
2630 NEXT I:PRINT#-2,TAB(35);TT$
2640 GOTO 1530
2650 IF PEEK(65314)=4 OR PEEK(65
314)=6 THEN PRINT@480,"     DATA
 BEING PRINTED NOW   ";:RETURN
2660 PRINT@480,"      PRINTER IS
 NOT READY";:SOUND100,5:FORX=1TO
500:NEXT:GOTO1530
2670 RETURN
2680 PMODE0,1:PCLEAR1:GOTO20
```

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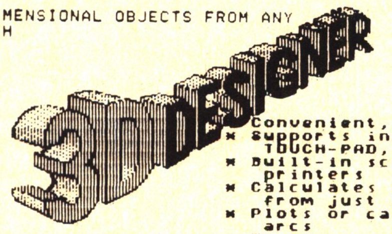

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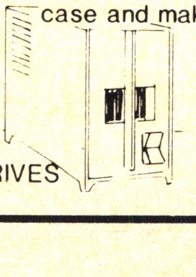

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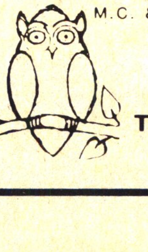

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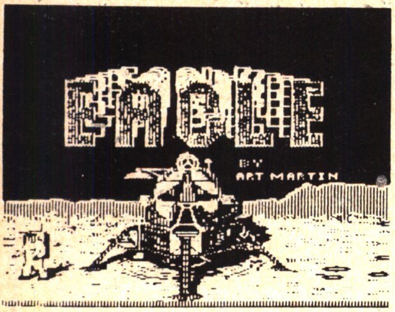

EAGLE

A graphic-enhanced lunar lander simulator. The pilot breaks out of lunar orbit and attempts a soft landing on the lunar surface. Joysticks control thrust and craft altitude and information is continually displayed on horizontal and vertical velocities, acceleration values, vertical and horizontal distances from target, fuel consumption and much more. On advanced levels, problems such as fuel leaks and computer screen failures can provide hair-raising final approaches. Disk version allows choice of landing site between Mars and Earth's moon. Takeoffs from the surface can be made and the upper stage placed back in orbit. The simulation is as educational as it is fun and exciting. A great tool for that future astronaut or physicist. 32K, 2 joysticks required. Available in tape or an enhanced disk version.

Tape - $24.95 Disk or Amdek - $29.95

SKETCHPAD

Sketchpad is a graphics drawing program designed to provide the computer hobbyist with easy manipulation of the powerful graphics capabilities of the Coco. Advanced programmers can design graphics screens and characters for Basic and ML programs and games. Sketchpad was used to create the graphics for "Eagle."

Two joysticks control cursors that provide end-points and boundaries for lines, boxes, circles, ellipses and painting. Point-to-point drawstrings may be plotted on the screen and then rotated, enlarged or shrunk, moved or inverted. Patterns may be programmed in easily to create dazzling illusions using lines, boxes, circles, ellipses and drawstrings. Sketchpad supports all PMODES and color sets and gives false colors in Pmodes 1 and 4. Text and graphics can be combined on high-resolution screens. All pictures and drawstrings can be saved to disk for future use. 32K, 2 joysticks required. Disk only. $29.95.

TDIR

Tape Directory

TDIR is a menu-driven, user-friendly tape directory program. When installed and maintained on your cassette tapes, it allows complete directory control of your tapes. This means you will no longer need to go through a complete tape to discover that the program you wanted is on another tape.

TDIR also eliminates the drudgery of trying to remember tape position settings, or program names. All this, and more, is controlled by TDIR. 16K tape. $24.95.

MAYCODE

Disassembler For The TRS-80™ Color Computer

A 6809 disassembler. It will read Object Codes from memory and convert them to standard 6809 assembly language mnemonics, which can be disassembled to the screen, printer, cassette, or disk. When output is to tape or disk, the source code can then be loaded into EDTASM for modification, even changing the origin address. 16K min., 32K recommended. Tape, $24.95. Disk or Amdek, $29.95.

The Digestive System

An educational quiz game for 2 players covering different areas of the human digestive system. Each question is assigned a point value relative to its difficulty. A fun way to learn about a serious subject. 16K.

The Circulatory System

Using the same format as "The Digestive System," this program covers the heart, lungs, veins, arteries, blood, etc. 16K.

BOTH ONLY:

Tape - $19.95 Disk or Amdek - $24.95

TESTMAKER

The TESTMAKER series is a menu-driven, user-friendly system of programs. These programs are internally linked, meaning that once you have begun, the program will automatically control the operation of the system.

TESTMAKER will allow the user to create both multiple choice and true-false tests. These tests may be run on the screen for an immediate test of the student or they may be printed and passed out to the class for a more standard exam.

TESTMAKER also has the feature of allowing an unlimited number of files with an unlimited file length. This means that the educator may create tests weeks, months, or years ahead and keep them on file until needed. This also means that each test may have as many questions as the educator wishes. 32K disk, $29.95.

ALPHACOPY

The Disk Organizer

An alphabetized disk directory is great, but if that should crash it doesn't help tell you where the programs are. ALPHACOPY will write the programs in alphabetical order. Each program will be written on the same or consecutive sectors, making rebuilding of the disk much easier than the other currently available "zapping" utilities. 32K disk. Disk or Amdek, $24.95.

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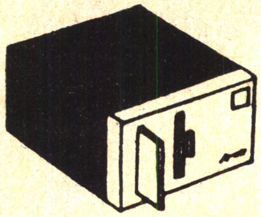

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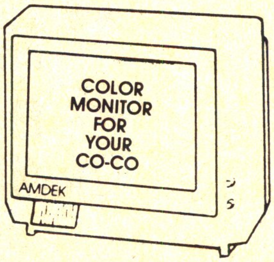

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You Can Invest In This One — T-bill Computation

By Walter J. Tucker

On Monday of each week, the U.S. Treasury borrows billions of dollars by auctioning 13-week and 26-week T-bills (treasury bills). The 52-week T-bills are auctioned on the fourth Thursday of each month. Many of the T-bills are purchased by the public at the "average" price, which is available after the auction. The discount rate is published on the following day in the financial pages of many newspapers. Some of these also include the price. (The results of the most recent auction can be obtained from a telephone tape, 202-287-4100.)

T-bill Computation provides the investment rate which equates the coupon rate of other investments, as well as the number of days to maturity, profit, and the amount of your federal income tax on the T-bill. The interest on U.S. Treasury bills is not subject to state income tax.

If your state has an income tax, the amount of this savings is also shown. The profit on a 52-week T-bill differs from the investment rate, which is comparable to the coupon rate on an investment which pays interest semiannually.

The program requires the discount rate. It also requires either the cost of the T-bill or the exact number of days to maturity. If neither of these are available, use 91, 182, and 364 days to maturity, respectively, for 13-, 26- and 52-week bills, as these figures are likely to be accurate since they change only when the day of issue or maturity would fall on a holiday.

For information or applications to purchase U.S. Treasury bills call 202-287-4114, or write to the Bureau of the Public Debt, Washington, D.C. 20239-0001.

(Walter Tucker, a retired engineer from the "Voice of America" and an avid radio amateur with the call KA1GQ, has written numerous other financial programs.)

70	145
170	156
300	139
420	230
END	192

The listing:

```
10 CLS0:GOSUB320:PRINT"THIS PROG
RAM PROVIDES THE COUPONOR INVEST
MENT RATE, PROFIT, DAYSTO MATURI
TY, AS WELL AS FEDERAL & STATE T
AX IMPLICATION OF EACH T-BILL.":
PRINT:PRINT:PRINT"DO YOU NEED IN
STRUCTIONS?  <Y/N>":PRINT"PRESS
<S> TO RECORD":PRINT:PRINT::
20 GOSUB520:IFW$="N"THEN100
30 IFW$="S"THEN450
40 CLS:PRINT"EACH WEEK THE U.S.
TREASURY      BORROWS BILLIONS OF
 DOLLARS BY  AUCTIONING 13 & 26
WEEK T-BILLS,USUALLY ON MONDAYS,
 AND 52-WEEK T-BILLS EACH MONTH.
 MANY ARE    PURCHASED AT AVERAG
```

```
E COST.";
50 PRINT"RATES ARE PUBLISHED IN
FINANCIAL PAGESOF MANY TUESDAY N
EWSPAPERS,SOME INCLUDE COST.";
60 PRINT"  RECENT AUCTION   RESU
LTS ARE ON TELEPHONE TAPE   (202
)-287-4100. FOR INFORMATION CALL
 (202)-287-4113 OR WRITE TO: THE
 BUREAU OF THE PUBLIC DEBT,    WA
SHINGTON, D.C. 20239-0001":GOSUB
530:GOSUB520
70 CLS0:GOSUB320:PRINT"THIS PROG
RAM REQUIRES DISCOUNT  RATES.  I
F NEITHER THE COST NOR THE EXACT
 DAYS TO MATURITY ARE  KNOWN, TH
EN USE 91, 182, & 364  DAYS RESP
ECTIVELY FOR 13 & 26   WEEK AND
1-YEAR T-BILLS AS THESEARE MOST
LIKELY TO BE ACCURATE."
80 PRINT:PRINT:PRINT:GOSUB530:GO
SUB520
100 CLS:GOSUB510:GOSUB470:PRINT@
324,"(C)1984 WALTER J. TUCKER";:
PRINT@356," 8211 CARRLEIGH PARKW
AY ";:PRINT@388," SPRINGFIELD, V
A. 22152 ";:GOSUB480
110 CLS:GOSUB320:INPUT"DISCOUNT
RATE IN %";A:PRINT:IFA<7ORA>15TH
EN110
120 INPUT"COST OR NUMBER OF DAYS
 TO        MATURITY";G:IFG<367THE
ND=G
130 IFG>366THENB=G
140 IFG<367THENB=INT(10000*(1-((
A/100)*(D/360)))*10+.5)/10
150 C=10000-B:IFG>366THEND=INT(C
*3.60/A+.5)
160 CLS:GOSUB320:PRINT"DISCOUNT
RATE=";A;"%":PRINT:PRINT"COST=$"
;INT(B*100+.5)/100:PRINT:PRINT"A
MOUNT OF INTEREST=$";INT(C*100+.
5)/100:PRINT:Y=365:IFD>=363ANDD<
=365THEN200
170 IFD>=181ANDD<=183THEN210
180 IFD>=90ANDD<=92THEN220
190 GOTO330
200 PRINT"1 YEAR -";D;"DAYS TO M
ATURITY":GOTO230
210 PRINT"6 MONTHS -";D;"DAYS TO
 MATURITY":GOTO240
220 PRINT"3 MONTHS -";D;"DAYS TO
 MATURITY":GOTO240
230 E=INT(100000*(SQR(((D/Y)^2)-
(4*(D/(2*Y)-.25)*(((B/100)-100)/
(B/100))))-(D/Y))/(2*(D/(2*Y)-.2
5))+.65)/1000:GOTO250
240 E=100000*(C*365)/(B*D)/1000
250 PRINT:PRINT"INVESTMENT RATE=
```

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```
";INT(1000*E+.5)/1000;"%":GOSUB3
40:GOSUB520:IFW$="R"THEN110
260 IFQ=1THEN290
270 CLS:PRINT:PRINT:PRINT:PRINT"
DOES YOUR STATE HAVE AN INCOME
TAX   <Y/N>":GOSUB520:PRINT:PRIN
T:Q=1:IFW$<>"N"ANDW$<>"Y"THENQ=0
:GOTO270
280 IFW$="Y"THENL=1
290 IFL=1THENCLS:PRINT:PRINT:PRI
NT:INPUT"WHAT IS YOUR STATE INCO
ME TAX   BRACKET(%)";ST:IFST<1OR
ST>20THEN290
300 CLS:PRINT:PRINT:PRINT:INPUT"
WHAT IS YOUR FEDERAL INCOME TAX
BRACKET(%)";H:IFH<1ORH>50THEN300
310 CLS:PRINT:H=H*.01:J=C*(ST/10
0):Z=(C-(H*(C-J)+J))/B:Y=(C-H*C)
/B:GOTO360
320 PRINT"   U.S. T-BILL COMPUTA
TION":PRINT:RETURN
330 CLS4:PRINT@164,"INFORMATION
IS INCORRECT";:PRINT@261,"RECHEC
K YOUR SOURCE OF";:PRINT@330,"IN
FORMATION";::FORV=1TO6000:NEXT:C
LS:GOTO110
340 PRINT@416,"<ENTER> TO CONTIN
UE":PRINT@448,"<R> TO RECOMPUTE
T-BILL":RETURN
350 PRINT@384,"<C> TO CHANGE TAX
 BRACKETS":RETURN
360 CLS:PRINT"COST=$";INT(B*100+
.5)/100:PRINT"AMOUNT OF INTEREST
=$";INT(C*100+.5)/100:PRINT:PRIN
T"IN A";H*100;"% TAX BRACKET YOU
R","FEDERAL TAX ON THIS T-BILL I
S","$";INT(H*C*100+.5)/100:PRINT
:IFST>0THENPRINT"IF TAXED BY YOU
R STATE AT";ST;"%";
370 IFST>0THENPRINT"STATE TAX WO
ULD BE $";INT(J*100+.5)/100
380 IFST>0THENPRINT"FEDERAL TAX
WOULD BE $";INT(100*H*(C-J)+.5)/
100,"THEN,TOTAL TAX WOULD BE $";
INT((H*(C-J)+J)*100+.5)/100
390 GOSUB350:GOSUB340:GOSUB520:I
FW$="C"THEN290
400 IFW$="R"THEN110
410 K=H*(C-J)+J:CLS:PRINT@64,"PR
OFIT IF ONLY FEDERALLY TAXED=",I
NT((((365/D)*(C-H*C)))/B)*10000
+.5)/100;"%":PRINT:IFST>0THENPRI
NT"PROFIT IF ALSO STATE TAXED=",
INT(((365/D)*((C-K)/B))*10000+.5
)/100;"%":PRINT
420 IFST>0THENPRINT"DIFFERENCE="
;INT((365/D)*((((C-H*C)/B)-((C-K
)/B)))*10000)/100;"%"
430 PRINT@416,"<ENTER> TO RECHEC
K              <^> TO RESTART PR
OGRAM":GOSUB520:IFW$="^"THEN10
440 GOTO360
450 CLS2:PRINT:PRINT:PRINT:PRINT
@192,"START RECORDER, THEN PRESS
 ENTER":MOTOROFF:INPUTW$:MOTORON
:CLS3:FORW=1TO6000:NEXT:PRINT@19
6,"NOW RECORDING 'T-BILLS'";:PRI
NT@228," (U.S. TREASURY BILLS) "
;:CSAVE"T-BILLS":CLS:MOTORON:FOR
W=1TO1000:NEXT
460 MOTOROFF:GOTO10
470 CLS5:C=63:F=31:PRINT@132,"
  COMPUTATION FOR     ";:PRINT@1
64,"  U. S. TREASURY BILLS  ";:P
RINT@196,"  ISSUED BY THE BUREAU
  ";:PRINT@228,"   OF THE PUBLIC
 DEBT   ";:PRINT@260," WASHINGTO
N, D.C. 20239 ";:PRINT@292,"####
####################";:RETURN
480 Z=4:FORK=0TO2:FORA=B TOC:SET
(A,D,Z):NEXT:FORH=E TOF:SET(C,H,
Z):NEXT:FORG=C TOJ STEP-1:SET(G,
F,Z):NEXT:FORI=F TOB STEP-1:SET(
J,I,Z):NEXT:Z=1
490 B=4:C=59:D=4:E=4:F=28:J=4:IF
K=1THENNEXTK
500 Z=3:B=6:C=57:D=6:E=6:F=26:J=
6:NEXTK:FORX=1TO3000:NEXT
510 A=0:B=0:C=0:D=0:E=0:F=0:G=0:
H=0:I=0:J=0:K=0:RETURN:FORW=1TO9
999:NEXT:RETURN
520 W$=INKEY$:IFW$=""THEN520:RET
URN
530 PRINT"#########PRESS ANY KEY
#########":RETURN
```

Submitting Material To RAINBOW

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs which will be useful/helpful/fun for other CoCo owners.

Program submissions must be on tape or disk and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary explaining how the program works. Generally, we're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a SASE to: Submissions Editor, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We will send you some more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

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40	David Bryan, Kentwood, LA
40	Jeff Dempsey, Eatonville, WA
25	Ryan Devlin, Louisville, KY
25	Joel Flaugher, Hamilton, OH
25	Patric Flaugher, Hamilton, OH
20	Russ Auld, St. Petersburg, FL
RADIO BALL *(Radio Shack)*	
1,465,000	★Les Dorn, Eau Claire, WI
1,103,090	Mike Sengstock, Meriden, CT
RAINBOW ROACH (THE RAINBOW)	
1,766,900	★Nicky Rockwell, Crouseville, ME
316,800	Don Wetherell, Charles City, IA
ROAD RACE (THE RAINBOW)	
5416.4	★Jon Hobson, Plainfield, WI
91.7	Bill Martin, Myrtle Beach, SC
ROBOTTACK *(Intracolor)*	
7,528,100	★Mike Scharf, Fremont, OH
3,364,100	Wade & Troy Woods, Paul MacLennen, Tiverton, Ontario
3,242,812	Edwin Prather & Cory Soper, Oxnard, CA
2,516,050	Horace Hamilton, Calgary, Alberta
2,216,950	Randy Hankins, Tabor, IA
SEA DRAGON *(Adventure International)*	
4,770	★Denis Dion Jr., Thetford Mines, Quebec
4,760	Simon Clavet, Thetford Mines, Quebec
SKIING *(Radio Shack)*	
01.10	★Mike Scharf, Fremont, OH
01:12	Sean Conner, Summit, NJ
05.85	John Hokpins, Greenville, SC
12.02	Brian Austin, New Salisbury, IN
12.08	Kelly Kerr, Wentzville, MO
SKRAMBLE *(Tom Mix)*	
61,020	★Paul Hotz, Herzlia, Israel
46,440	Steve Schutjer, Hazel Green, WI
39,800	Michael Derman, Tel-Aviv, Israel
28,810	Laura Hotz, Herzlia, Israel
28,250	Saul Kirsch, Ra'anana Israel
23,120	Joel Kirsch, Ra'anana Israel
22,010	Omri Arad, Ra'anana Israel
14,440	Oren Bergman, Herzlia B., Israel
SNAKER (THE RAINBOW)	
1:24	★Luanne Ashby, Phoenix, AZ
1:26	Dan Sobczak, Mesa, AZ
1:37	Susan Ballinger, Uxbridge, Ontario
1:59	Baiju Shah, Deep River, Ontario
2:21	Eric Burk, Williamsvill, NY
STARFIRE *(Intellectronics)*	
1,000,000	★Jeff Roberg, Winfield, KS
TIME BANDIT *(MichTron)*	
600,550	★Mark Wooge, Omaha, NE
413,620	Doug Seibel, Tumbler Ridge, British Columbia
248,530	Sally Naumann, Hailey, ID
225,950	Chris Oberholtzer, Lexington, MA
142,200	Fred Naumann, Hailey, ID
43,440	Tim Rueb, Atlanta, GA
18,850	Denis Dion Jr., Thetford Mines, Quebec
15,400	Simon Clavet, Thetford Mines, Quebec
TRAILIN' TAIL (THE RAINBOW)	
119,705	★Diego Gallina, Summit, NJ
105,300	Jerry Dill, Frankfort, MI
102,930	Philip Parent, Smiths Falls, Ontario
94,810	Jean-Marc Parent, Smiths Falls, Ontario
76,275	Michael Rosenberg, Prestonsburg, KY
TRAPFALL *(Tom Mix)*	
70,392	★Paul Hotz, Herzlia B., Israel
TREKBOER *(Mark Data)*	
161	★Warren Scollan, Seattle, WA
TUT'S TOMB *(Mark Data)*	
163,060	★Michael McCafferty, Oceanside, CA
158,000	Chris Russo, Miami, FL
134,580	Judy Smith, Gresham, OR
106,460	Eileen Kaakee, Royal Oak, MI
104,360	Gary Marshall, Layton, UT
72,140	Anthony Ebert, Galveston, IN
UGH *(Softek International)*	
4,875	★Oren Bergman, Herzlia B., Israel
VENTURER *(Aardvark)*	
2,260,200	★Jason Morrison, Spruce Grove, Alberta
WILDCATTING *(Radio Shack)*	
250,450	★John Kidd, Clarksboro, NJ
33,090	Jack Ballinger, Uxbridge, Ontario
31,973	Lisa Ballinger, Uxbridge, Ontario
29,850	Mike Galasso, Richmond, KY
WILLY'S WAREHOUSE *(Intracolor)*	
183,500	★Alan Morris, Chicopee, MA
93,700	Craig Kluger, Miami, FL
ZAXXON *(Datasoft)*	
2,057,800	★Chris Oberholtzer, Lexington, MA
1,510,000	James Quadrella, Brooklyn, NY
666,000	Andy Green, Whitehall, PA
401,900	Mike Hughey, King George, VA
370,400	Chris Coyle, Selden, NY
134,800	Sean Conner, Summit, NJ
133,000	Diego Gallina, Summit, NJ
126,500	Kevin Kordana, Poughkeepsie, NY
96,300	Vernon Johnson, Parkville, MD
88,500	Nanook Tuefferd, Hudson, NH

— Debbie Hartley

SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, we offer this column of pointers for our game-playing readers' benefit. If you have some interesting hints and tips, we encourage you to share them by sending them to the Scoreboard, c/o THE RAINBOW.

MEMORANDUM FOR MADNESS

Scoreboard:

For all of you who have trouble with *Madness and the Minotuar*, here are a few hints.

To get out of the maze, find the small pit and jump over it, but if your physical condition is below 245, then you won't make it. To get past the hydra, find the rope and type in TIE HYDRA. Last but not least, to kill the Minotuar, you must have the sword, shield and power ring.

Charles Farris
Lebanon, IL

PASSING KARRAK'S PIT

Scoreboard:

I have to write to advise the true Adventurers out there. Yes, there is a way to get past the pit in game 1 of *The Amazing Adventures of Karrak* (THE RAINBOW, Feb. '84), and I don't mean by cheating (example: altering the listing). If you will notice, when you take inventory you have a sack. By using the back-arrow sign (a shifted up-arrow) you can inventory the sack. Alas, there is a pouch. GET POUCH and OPEN POUCH. 'GASP' a coin falls out. I must confess I beat my brains out for a few hours before my wife, who had no idea what was going on, suggested the proper answer.

Happy Adventuring!

Wayne T. Holiman
Mesquite, TX

Scoreboard:

I have heard of many people who are stuck in *The Amazing Adventures of Karrak* (THE RAINBOW, Feb. '84) at the pit with the slot. Put your sword in the sack and then GET the pouch. Open it and your troubles are over (at least for now!).

Susan Ballinger
Uxbridge, Ontario

DIZZINESS REMEDY

Scoreboard:

In *Bedlam*, if you get a lobotomy, simply type PLUGH and it will cure the dizziness. What are the exact words to use to kill the dog? It always changes. Write to me if you know at 301 Caravel Dr., 19701.

Stephen Slack
Bear, DE

ANSWERS TO ADVENTURES

Scoreboard:

I have solved the following Adventure games: *The Amazing Adventures of Karrak, Black Sanctum, The Trip, Arconiax Assignment, Enrak, Merro's Crown, Raaka-Tu, Sir Randolph of the Moors* and *Unexplored Mansion*. I would be more than glad to help anyone having problems with these Adventures. Just send me a SASE and I will get back to you as soon as possible.

In *Sands of Egypt*, does anyone know what to do when you're in the treasure room? Do you do something with the ladder or go above ground? Write to me at 51 Butler Pkwy., 07901.

Sean Conner
Summit, NJ

DUNGEON-AID

Scoreboard:

I have the game *Dungeons of Daggorath* and have gotten to the fourth level. I can kill any creature there besides the galdrog. Can anyone help? Also, my heartbeat gets to about thirty beats a second. What creatures have hale or thews' flasks?

If you need help before the fourth level, the blob brings you a Vulcan ring on the first level. Type I FIRE. The Rime ring on second level is I ICE. Stow these and use them for the wizard's image. On the first level turn around, move, turn right, move seven times, turn right, move, move and there is a hole in front of you! On the second level, face down the long corridor, move down it to the end, turn left, move three times, turn right and follow the doors. When you are in a left and right corridor, go right. Go as far as you can and you've found it! On the third level, make sure you use a Solar Torch or the scorpion, and the wizard's image is hard to see. After the first time you attack the wizard's image, use a hale flask.

For more help, send a SASE and the information you need to 32 Daniel St., 02159.

David Heinemann
Newton, MA

SHAMEFULLY HIGH SCORE

Scoreboard:

An easy way to run up your score in *Shamus* as high as you like is to step back and forth repeatedly across the threshold between two rooms, firing continuously into the rooms. Can anyone explain how to use the keys to unlock the locks? And is there a green key? I can only find the red and the white keys. Write to me at P.O. Box 15564, 20003

John•Tiffany
Washington, DC

FUEL SHORTAGE

Scoreboard:

I need help on *Zaxxon*. After I get over 100,000 I start running out of fuel really fast. Any help or hints would be greatly appreciated. Please send to 10 Ronnie Lane, 12601.

Kevin Kordana
Poughkeepsie, NY

PYRAMID PLEA

Scoreboard:

I am a proud owner of a TRS-80 Color Computer. The very first game I got was *Pyramid*. I have tried to figure out how to solve this game and it has nearly driven me crazy. In the Jan. '85 issue of THE RAINBOW ("Scoreboard Pointers" Page 178), I found many people had solved it. I would like for anyone to write me and give me the solution to it. My address is 5208 Ventura Dr., 27406. Your help will be greatly appreciated.

Brian Beasley
Greensboro, NC

Scoreboard:

If anyone wants a complete map and full directions for playing *Pyramid*, send $1 and a SASE, or if you have one or two questions about it, send a SASE and I'll be glad to help. My address is Box 224, R0A 0C0.

Keep up the fantastic work on your great magazine.

Ian Loeppky
Blumenort, Manitoba

Scoreboard:

I have solved *Raaka-Tu* and *Pyramid* and I have a few pointers for my fellow Adventurers. For *Pyramid* don't worry about the scepter, you'll find you don't need it, so why waste valuable moves getting it. Also for those of you who are wondering if you can save your move for another day, well here is the answer. Just type `SAVE` and you will see "ready cassette." Then when you want to start again just load in *Pyramid*, `EXEC` and type `LOAD`. You will see "ready cassette," then hit ENTER.

For *Raaka-Tu*, if you keep track of your moves when you get to the wall with the vines, you will find it very easy to get out at the end. Wait until the guards are coming from the right, then keep track of the moves in this way: 1-type LOOK; 2-type S; 1-type CLIMB VINES; 2-type E etc. If you do this 1-2-1-2 fashion, you will find that when it comes time to leave the temple if your count is -1- then it is safe to do so, but if your count is -2-, beware.

If you would like any information or if you would like the solutions for either *Raaka-Tu* or *Pyramid* then either send $1 or a SASE to 2432 Capitol Hill Crescent N.W., T2M-4C2. Remember, your envelope should have a $.37 stamp on it.

David R. Oelhaupl
Calgary, Alberta

ADVANCING ON DONKEY KING

Scoreboard:

Are you tired of playing *Donkey King* because you can never seem to get past the first level? Try this: `CLOADM` the game, `POKE 12889,2`, now `EXEC`. This will let you start at the elevators level.

If you `CLOADM`, `POKE 12889,10` you can start at the rivits level. And if you `CLOADM`, `POKE 12889,18` you can start at the conveyor belt level.

Also if you `CLOADM`, `POKE 12914,X` you can pick how many extra men you want to play with. `X` being any number from one to 255.

Lastly, I'm looking for a CoCo pen pal with whom I can share ideas and knowledge. It might make these Wisconsin winters bearable. My address is 708 Michigan Ave., 53081.

Bill Bernico
Sheboygan, WI

Scoreboard:

I have just recently solved the new graphics Adventure *Blackbeard's Island*. I would like to offer other Adventurers help. I have made a clue sheet with all 86 moves required to solve the game, but with one slight difference. This clue sheet has all the clues encoded so you can get only the clues you want without accidentally seeing the answer and spoiling the game. The clue sheet comes with the decoder. Anyone interested should send $1 to 539 South Berthe Ave., 32404.

Mikel Rice
Panama City, FL

16K
ECB

How To Figure Foreign Currency Exchange Rates

By Gordon Lewin

Over the past several years, my wife and I have had the good fortune to be able to travel to several foreign destinations for a combination of business and vacation. Being typical tourists, we have always been on the lookout for good bargains and also for items that are difficult to come by at home.

A big hindrance to our shopping has always been converting the local currency to the U.S. dollar. Even using a hand-held calculator has proven to be irksome for me and doesn't appeal to my wife (who keeps forgetting the formula).

In any event, the following simple little program came about when I returned from Italy (lira=1677:1) where I made up a handwritten table to aid in converting sales prices to understandable costs.

Using the conversion table, for example, I want to buy a beautiful pair of Italian shoes, but the price tag says 76,555 lira. Wow! Get out your trusty copy of the table and look up 76,555 lira, which falls between $40 and $50. Sometimes having just that information can be enough to permit you to consummate the purchase, but if not, subtracting 67,000 lira ($40) from the 76,000 leaves 9,000 or between $6 and $5, or about $46 total. Interpolating in this manner, you can calculate any asking price.

Foreign currency exchange rates are published in newspaper business sections or by local banks. Before embarking on a trip, just enter the name of the currency and its rate of exchange to one U.S. dollar for each country to be visited. Hit the ENTER key and *Voila!*

The program requires Extended BASIC because of the use of the `PRINT USING` functions, but shouldn't be difficult to alter to Color BASIC. For those readers who live outside the U.S., simply change the program to refer to your own currency wherever "U.S. dollars" occurs (lines 30, 40, 140, 210, 215). The program logic is merely a multiplication exercise using `FOR/NEXT` loops to print out the table. More time was spent in trying to do a reasonable job of error trapping than with the BASIC program. One last thing, if you modify Line 3 of the program to add the month of this issue and the page number, you will always be able to find the source of the program.

(Gordon B. Lewin is a materials manager at U.S. Divers Company, affiliated with Jacques Cousteau. He would like to someday write a book combining the subjects of his three hobbies: world travel, photography and computers.)

Conversion Table of Lira to U.S. Dollars
at the Rate of 1677 to 1

U.S. Dollars		Lira	U.S. Dollars		Lira
1	=	1677	2	=	3354
3	=	5031	4	=	6708
5	=	8385	6	=	10062
7	=	11739	8	=	13416
9	=	15093	10	=	16770
11	=	18447	12	=	20124
13	=	21801	14	=	23478
15	=	25155	16	=	26832
17	=	28509	18	=	30186
19	=	31863	20	=	33540
30	=	50310	40	=	67080
50	=	83850	60	=	100620
70	=	117390	80	=	134160
90	=	150930	100	=	167700

140 45
END 196

The listing:

```
1 '*************CONVERT*********
2 '****1984, BY GORDON LEWIN****
3 '****MARCH 1985 RAINBOW*******
*
10 CLS(3)
20 PRINT@142,"MONEY";:PRINT@204,
"CONVERSION";:PRINT@270,"TABLE";
30 PRINT@448,"U.S. DOLLARS IN FO
REIGN CURRENCY";:GOSUB 390
40 CLS:PRINT@1,"THIS PROGRAM WIL
L PRINT OUT A   TABLE OF U.S. DO
LLARS EXPRESSED AS A FOREIGN CUR
RENCY.  ALL YOU NEED TO DO IS AN
SWER A FEW VERY SIMPLE QUESTIONS
.":GOSUB390
50 PRINT@456,"ARE YOU READY?"
60 I$=INKEY$:IF I$="Y" THEN70 EL
SE60
65 FOR X=1TO500:NEXTX
70 CLS(3):PRINT@32," WHAT FOREIG
N CURRENCY NEEDS TO  BE CONSIDER
ED FOR CONVERSION?  ";:PRINT STR
ING$(34,175);:INPUT FC$
75 IF FC$="" THEN 70
80 Z=127:Q$=STRING$(32,175)
90 IF LEN(FC$)<23 THEN 135:PRINT
@ 360,"USE AN ABBREVIATION!!":FO
RX=1TO150:NEXTX
100 Z=Z+16
110 PRINT@352,STRING$(32,Z)
120 FOR C=1TO 150:NEXT C
130 IFZ=255 THEN 140 ELSE 90
135 PRINT@352,Q$:PRINT@352,FC$;
140 PRINT@352,"HOW MANY "FC$;:PR
INT@384,"ARE THERE IN ONE U.S. D
OLLAR ?";:INPUT FM$
150 IF FM$="" THEN 140 ELSE FC=V
AL(FM$)
160 IF FC<>0 THEN 170 ELSE CLS(3
):GOTO140
170 IF FC<0 THEN PRINT@352,STRIN
G$(128,175) ELSE 175:GOTO 140
175 CLS(3)
180 PRINT@258,"IS THE PRINTER RE
ADY ? ? ? ";
185 I$=INKEY$:IFI$="Y"THEN190 EL
SE 180
190 CLS(3):PRINT@262,"PRINTING..
.";
210 PRINT#-2:PRINT#-2,"CONVERSIO
N TABLE OF "FC$" TO U.S. DOLLARS
 AT THE RATE OF "FC" TO 1":PRINT
#-2:PRINT#-2
215 PRINT#-2,TAB(4)"U.S. DOLLARS
        "FC$;:PRINT#-2,TAB(44)"U
.S. DOLLARS        "FC$:PRINT#-2
225 FT=FC
230 FORT=1 TO 20
250 PRINT#-2, USING"        ###
       =     ######         ";T,
FT;:FT=FT+FC:NEXT T
270 FOR T=30 TO 110 STEP 10:FT=F
C*T
290 IF T>100 THEN 310 ELSE 250
310 PRINT #-2:PRINT#-2:PRINT#-2
330 PRINT@262,"DONE PRINTING ";
350 PRINT@ 322,"ANOTHER CURRENCY
 TABLE? (Y/N)";
370 I$=INKEY$:IF I$="" THEN 370
ELSE IF I$="Y" THEN 70 ELSE CLS(
3):PRINT@270,"END";
380 GOTO 380
390 FOR X=1TO1500:NEXT X:RETURN
```

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by C.E. Laidlaw

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by Terry A. Steen

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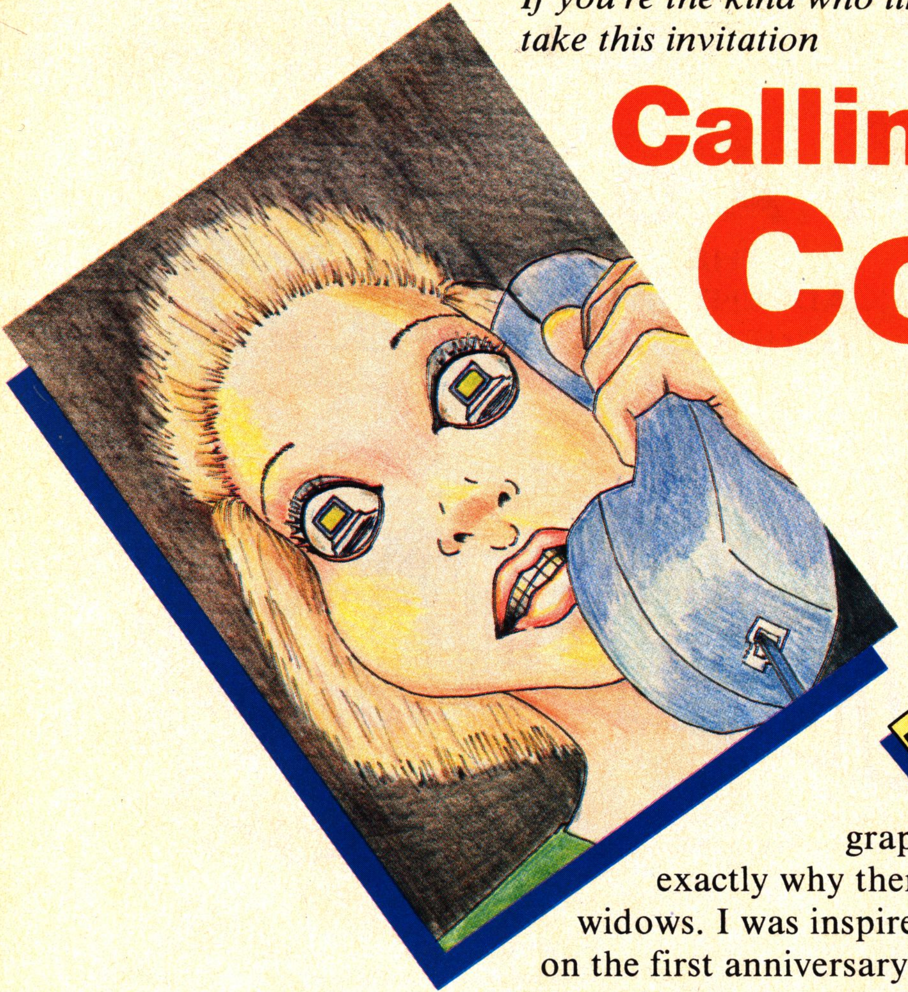
If you're the kind who likes a dare, then take this invitation

Calling All CoCo Nuts

By Paul Poulosky



This 16K ECB graphics display explains exactly why there are so many CoCo widows. I was inspired to write *CoConuts* on the first anniversary of having my CoCo. *CoConuts* is a program designed to be expanded upon. We challenge ambitious programmers to make another screen or two. Good luck!

(Paul Poulosky, a junior in high school, has been a CoCo owner for a year. His hobbies are playing fantasy games, reading science fiction/fantasy books and computer programming.)

200	184
500	147
670	171
END	164

The listing:

```
0 'COPYRIGHT (C) BY PAUL POULOSK
Y    7/22/84
10 PMODE4,1
20 SCREEN1,2
30 PCLS
40 DRAW"BM80,168;R96;U65;L96;D65
"
50 DRAW"BM80,133;R96"
55 PAINT(81,132),1,1
60 DRAW"C2;BM165,128;L7;U4;R7;D4
"
70 DRAW"BM176,128;L6;R6;U4;L6;R6
;U4;L6;R6;U4;L6;R6;U4;L6;R6;U4;L
6"
80 DRAW"BM80,128;R6;L6;U4;R6;L6;
U4;R6;L6;U4;R6;L6;U4;R6;L6;U4;R6
"
90 DRAW"C1;BM85,138;D30;R86;U30;
L86"
100 PAINT(84,138),1,1
110 DRAW"C0;BM80,133;R96"
120 DRAW"C1;BM100,165;R56;U3;L56
;D3"
130 PAINT(101,164),1,1
```

```
140 DIMA(5,5)
150 DRAW"BM100,140;D3;R3;U3;L3"
160 PAINT(101,141),1,1
170 GET(99,139)-(104,144),A
180 FORX=95 TO 160 STEP5
190 PUT(X,139)-(X+5,144),A
200 NEXT
210 PUT(160,139)-(165,144),A
220 DIMB(5,5):GET(100,139)-(105,
144),B
230 FORX=91TO161 STEP 5
240 PUT(X,146)-(X+5,151),B
241 PUT(X,153)-(X+5,158),B
245 NEXT
250 DRAW"BM60,12;R136;D70;L136;U
70
260 DRAW"BM65,17;R100;D60;L100;U
60"
270 DRAW"BM170,77;R22;U30;L22;D3
0"
280 CIRCLE(177,20),3
290 CIRCLE(188,20),3
300 CIRCLE(181,33),6
310 DRAW"BM120,103;U21;L1;D21;L1
;U21"
400 DRAW"BM100,20;R5;D10;L5;R10;
L5;U10;R5"
410 DRAW"BM114,18;R2;D1;L2;D1;R2
;D3;L1;U3"
420 DRAW"BM120,20;D10;U10;F5;E5;
D10"
430 DRAW"BM81,35;R6;L6;D6;R6"
440 DRAW"BM90,35;R6;D6;L6;U6"
450 DRAW"BM99,35;R6;L6;D6;R6"
460 DRAW"BM108,35;D6;R6;U6;L6"
470 DRAW"BM117,35;D6;U6;F6;U6"
480 DRAW"BM126,35;D6;R6;U6"
490 DRAW"BM135,35;R6;L3;D6"
500 DRAW"BM144,35;R6;L6;D3;R6;D3
;L6"
510 DRAW"BM99,45;R6;D6;L6;U6"
515 LINE(108,45)-(111,51),PSET
520 LINE(111,51)-(114,45),PSET
530 DRAW"BM117,45;R6;L6;D3;R4;L4
;D3;R6"
540 DRAW"BM126,45;R6;D3;L6;U3;D6
;U3;R3;F3"
550 DRAW"BM108,55;D6;U6;F3;E3;D6
"
560 DRAW"BM117,55;F3;E3;G3;D3"
570 DRAW"BM81,65;R6;L6;D6;R6"
580 DRAW"BM90,65;R6;D6;L6;U6"
590 DRAW"BM99,65;R6;L6;D6;R6"
600 DRAW"BM108,65;R6;D6;L6;U6"
610 DRAW"BM126,65;R6;D6;U3;L6;D3
;U6"
620 DRAW"BM135,65;D6;U6;F6;U6"
630 DRAW"BM144,65;D6;R4;E2;U2;H2
;L4"
640 FORX=1TO2000:NEXT
650 FORX=66TO164
660 LINE(X,18)-(X,76),PRESET
670 NEXT
680 DRAW"BM103,20;R6;L3;D6"
690 DRAW"BM112,20;D6;U3;R6;D3;U6
"
700 DRAW"BM121,20;R6;L6;D3;R4;L4
;D3;R6"
710 DRAW"BM85,30;R6;D3;L6;U3;D6;
U3;R3;F3"
720 DRAW"BM94,30;R6;D6;U3;L6;D3;
U6"
730 DRAW"BM103,30;R6;L3;D6;R3;L6
740 DRAW"BM112,30;D6;U6;F6;U6"
750 DRAW"BM121,30;R5;F1;D2;L6;R6
;D2;G1;L5;U6"
760 DRAW"BM130,30;R6;D6;L6;U6"
770 DRAW"BM139,30;D6;E3;F3;U6"
780 CIRCLE(115,76),50,,.4,.5,.99
790 CIRCLE(115,56),50,,.4,.5,.99
800 CIRCLE(115,71),50,,.4,.5,.99
810 CIRCLE(115,66),50,,.4,.5,.99
820 CIRCLE(115,61),50,,.4,.5,.99
830 PAINT(67,71),1,1
835 PAINT(67,61),1,1
840 FORX=1TO2000:NEXT
900 FORX=66TO164
910 LINE(X,18)-(X,76),PRESET
920 NEXT
930 GOTO 400
1000 GOTO 1000
```

One-Liner Contest Winner . . .

Echo plays musical notes that you specify. Just type in a note letter and an octave number and press ENTER. You can put more than one combination on a line.

The listing:

```
0 CLSRND(8):DIMA$(256):PLAY"O3T2
55L255":INPUT"NOTES";A$:FORX=1TO
LEN(A$):A$(X)=MID$(A$,X,1):A=VAL
(A$(X)):IFA<6ANDA>0THENPLAY"O"+A
$(X):NEXTX ELSEIFA$(X)>"G"ANDVAL
(A$(X))=0THENPRINT"ERROR!":END E
LSEFORZ=20TO1STEP-1:V$="V"+STR$(
Z):PLAYA$(X)+V$:NEXTZ,X:RUN
```

Joshua Jackson
South Salem, NY

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

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ONLY

$99.95

Have you ever lost a program and didn't have a backup? Sooner or later it happens to everyone. The best policy is to have a backup of EVERYTHING. Thus comes the problem - many programs are copy-protected and won't backup easily. So how do you protect your investment?

The MASTER KEY was developed just for this problem. Just as a master key unlocks all doors in a building, this MASTER KEY will unlock ALL programs that load into your CoCo's memory. And it's as easy as flipping a switch! Once you have control, you can copy your programs, proctected or not, to tape or disk. The MASTER KEY offers:

Complete Disassembler
Display/Change memory in Hex or ASCII
View memory in all Graphic Modes
Versatile printer routine for All printers
Rom-Pak model has gold contacts for more reliable operation.
Comprehensive, easy to follow manual

Search for text or M/L routines
Copy memory from one location to another
Write memory to tape or disk
Defeats All auto-start programs,
Rom-Pak design allows use of disk system while Master Key is installed.
Works with all versions of CoCo, 16K+

The MASTER KEY may be used to convert many programs from tape to disk, and yet does not require a background in assembly language. Using the METHODS section of the manual will allow even a novice to copy many programs. As you learn more about assembly language, you'll be able to use the MASTER KEY's full capabilities.

You can leave the MASTER KEY plugged in all of the time. The gold contacts will improve the I/O of your disk drive, and at the flip of a switch you'll have a quality disassembler. The Examine/Change feature will allow the entry of short M/L routines, and the Screen command will allow quick debugging of graphic screens.

30 DAY MONEY BACK GUARANTEE: If you find any program that MASTER KEY cannot take control of, simply return for a full refund.

NOTICE: The MASTER KEY has been developed as an educational tool and to allow the user to examine and save for archival purposes programs he/she has purchased.

NOTE: "F" board owners must cut a capacitor - details included.

SUPPLIED ON ROM PAK MODEL #MK035

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Enables the Full 64K of RAM in your 64K Color Computer. Provides up to an additional 16K of RAM. Permits you to change, modify or copy the BASIC, EXTENDED BASIC, ROMPACK, OR DISK PACK.

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Tape-Dir is a basic program used for displaying and/or printing information about cassette files. In addition to listing file name, Tape-Dir will list and/or print the following information:

1. Type of file - Machine Language, Data, Basic.
2. Format - Binary or ASCII.
3. M/L Start, End, and Execute addresses.
4. For Basic & Data Files - will show number of bytes used! Useful for sorting out your tape files by those that will run on your 16K, 32K machine!
5. Will bypass tape I/O errors - no aggravation!

REQUIRES 16K EXTENDED COCO, CASSETTE PLAYER. (PRINTER OPTIONAL)

CASSETTE $11.99

★★★★★★ OS-9 "CONVERT" ★★★★★★

New – From Computize . . .

This high quality M/L Utility will CONVERT Standard OS-9 Formatted Files/Disks (5¼") to Radio Shack OS-9 to run on your COCO. Will also convert 40 track to 35 track if you require. Runs under COCO OS-9.

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SUPPLIED ON DISK ONLY $49.95

FASTAPE

The Next Best Thing To A Disk Drive
From Spectro Systems

Fastape gives you cassette I/O at 3000 baud-Twice Normal Speed. It uses the high-speed (POKE 65495,0) mode, and makes it convenient to stay in this mode throughout. Features automatic adjustment of cassette and printer parameters when speed mode is changed. Control-key functions for many Basic commands and for changing speed modes. Compatible with all tape file types. Can be used with Telewriter-64 and many other utilities.

"I strongly recommend this fine utility" Rainbow, 7/83
"A treat for those without disk systems" Hot Coco, 10/83

REQUIRES 16K COCO **CASSETTE $21.95**

THE PEEPER

A Unique Interrupt-Based Program Tracer
From Spectro Systems

Imaging being able to monitor the operation of a machine-language program While It Is Running. To display any portion of memory in any of Coco's 26 documented display modes, and to move through memory using the arrow keys. To slow the action to a crawl, or freeze it at will. Instantly switch between watching the output of your program and watching Peeper dynamically display (on screen or printer) the contents of the 6809's registers and stack, showing changes as they are happening. In the slowest speed mode, Peeper provides continuous single-stepping; faster modes give a coarser trace. Or, halt the action and single-step by repeatedly pressing the space bar. Peeper supports breakpoints, memory examine/change, and more. Think how much easier it would be to modify someone else's ML software if you could determine what routines were being executed at any given point!

For fun, (and this requires no ML experience), use Peeper with arcade games, watching the fine details of the animation effects in slow motion. See how the game looks and plays in other graphics modes. Or watch what is happening on "hidden screens" you never see. (Makes a superb demonstration.)

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ON CASSETTE (COPYABLE TO DISK)
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The first of a two-part series

So, You Want To Sell Your Software . . .

By Susan P. Davis

Many people write a piece of software for the Color Computer which they think other people could use and enjoy. There are three ways to go: donating the software to the public domain by sending it to CompuServe or other bulletin boards, submitting it for publication in THE RAINBOW or another magazine, or trying to sell the program.

People who decide to sell a piece of software that they have written then need to decide whether they want to sell it themselves or if they want to submit it to an existing software house. There are many pros and cons related to each choice. The final decision is truly an individual one, often based on the amount of time and money the author has to invest in his/her program and not on the quality of the software.

Let's examine the advantages and pitfalls of trying to sell the software yourself. Next month, we will discuss having a software house market your program.

(Susan Davis has a master's degree in linguistics and has taught Spanish on the high school and college levels. She is also a CLU with seven years experience in the life and health insurance fields. In addition, she designs educational programs for Sugar Software, which she owns with her husband, Gary.)

The first decision that you have to make is the form that your business will take. If you are setting up the business all alone, you can either have a sole proprietorship or form a corporation. Either way, you may have as many employees as you wish. If you plan to start the business with another person, you can have a joint venture, a partnership or a corporation. If you have had a business before, you know the pros and cons of each of these business forms. If not, you will want to consult your attorney, Small Business Association and/or accountant before making your decision.

Now, let's get a business name. Choose a name that tells something about you or your business. After you decide on a good name, you will have to register this name with the state in which you reside. You will have to pay a fee for this. The state will look into its database of registered company names to make sure that you have not used a name already in use or a name that is very close to one already in use. You should not start using your business name until your state has given you the go-ahead.

After the state OKs your new business name, it will tell you about even more fees which you must pay. The state, county and local fees that you will have to pay vary, and you must find out about them. Ignorance here is no excuse and you will probably have penalties to pay if you do not pay all your fees at this time. You will need a vendor's license for each state in which you will be selling your software. This license is renewed annually. This vendor's license obligates you to collect and send in at various intervals the sales tax levied by your state.

You will need to establish a business relationship with a bank. You will need a business checking account and perhaps business credit cards. The "rules" for this account will probably be different from those of your personal account, and you will probably incur more charges. Do you need a loan to get started in your business or to expand? Your business banker will be able to help you here. If you want to offer your customers charge privileges, you will need to apply to be a Visa/Mastercard merchant. The bank will take a certain percentage of each charge card sale; the newer you are, the higher your percentage. You will probably find this well worth it, as phone customers can easily order after they have all the information they need about your program.

You and the bank will need to decide how much money you can afford to lose if things do not go well at first. If you do not achieve these financial goals, you will need to do a serious reevaluation.

Finally, you are ready to start! Where will you conduct your business — from your home or from a separate office or store? If you will be leasing a store or office, you will need money for rent and utilities before the first sale is even made. Most people start their Color Computer businesses from home. Even THE RAINBOW started off in Lonnie Falk's house, eventually taking over every inch of habitable space. (Now I hear they have had to expand the Prospect, Ky., city limits to accommodate all the growth.) If you will be running your business from home, do you have a separate place to do the business? The IRS has tightened up on the "office in the home" rule, and you must have a place where you conduct your business and don't do *anything* else. You will need to decide if you will get a separate business telephone, if you will get an 800 number and how you want to handle your long distance calls.

Next, survey your equipment. Do you have enough computers, tape recorders, disk drives (according to Gary, my husband, no one ever has enough disk drives) and controllers and tape duplicators to fill orders? If you don't, will you buy the machines or will you have your duplication professionally done?

You will need to find bulk suppliers of tapes and diskettes, mailing envelopes and office supplies. Many of these places advertise. You can probably get good recommendations from other software houses and local businesspeople.

There is a lot of artwork to consider in the software publishing business. You will need to develop a logo to use on your business cards, letterhead and magazine advertising. Documentation booklets need to be designed. You will need to decide what kind of packaging you want to use and who will do it for you. All of these things will have to be printed. You can attempt to do this all yourself or you can hire someone else to do it for you. The people who purchase software have become more sophisticated, and ads that were acceptable two years ago are no longer seen. Your ads need to attract their attention so that they can read about your product.

Now is the time to set up an advertising budget. This will help you and/or your advertising director or agency make the best decisions. Will you advertise only in magazines like RAINBOW, which are Color Computer specific or will you also consider magazines which deal with other computers? A call or letter to the advertising manager will get you a copy of the latest rate card. The ad rates, sizes of the ads, discount terms and conditions, mechanical requirements, issuance and closing dates will all be spelled out for you.

You will also have to consider attending trade shows. There are Color Computer specific shows such as the RAINBOWfests and there are business software shows, educational software shows, etc., for all home computers.

You will need to develop a catalog, a flyer or both. Will you do mass mailings and how will you develop your mailing list? You might investigate the advantages of purchasing a bulk mailing permit or renting a post office box. You will need to develop policies about COD orders, extending credit and your collection procedures. Obviously, there are many factors which will influence your decision. Once you have considered the above questions, and others that may occur to you, it's time to start. You are ready to go! Good luck!

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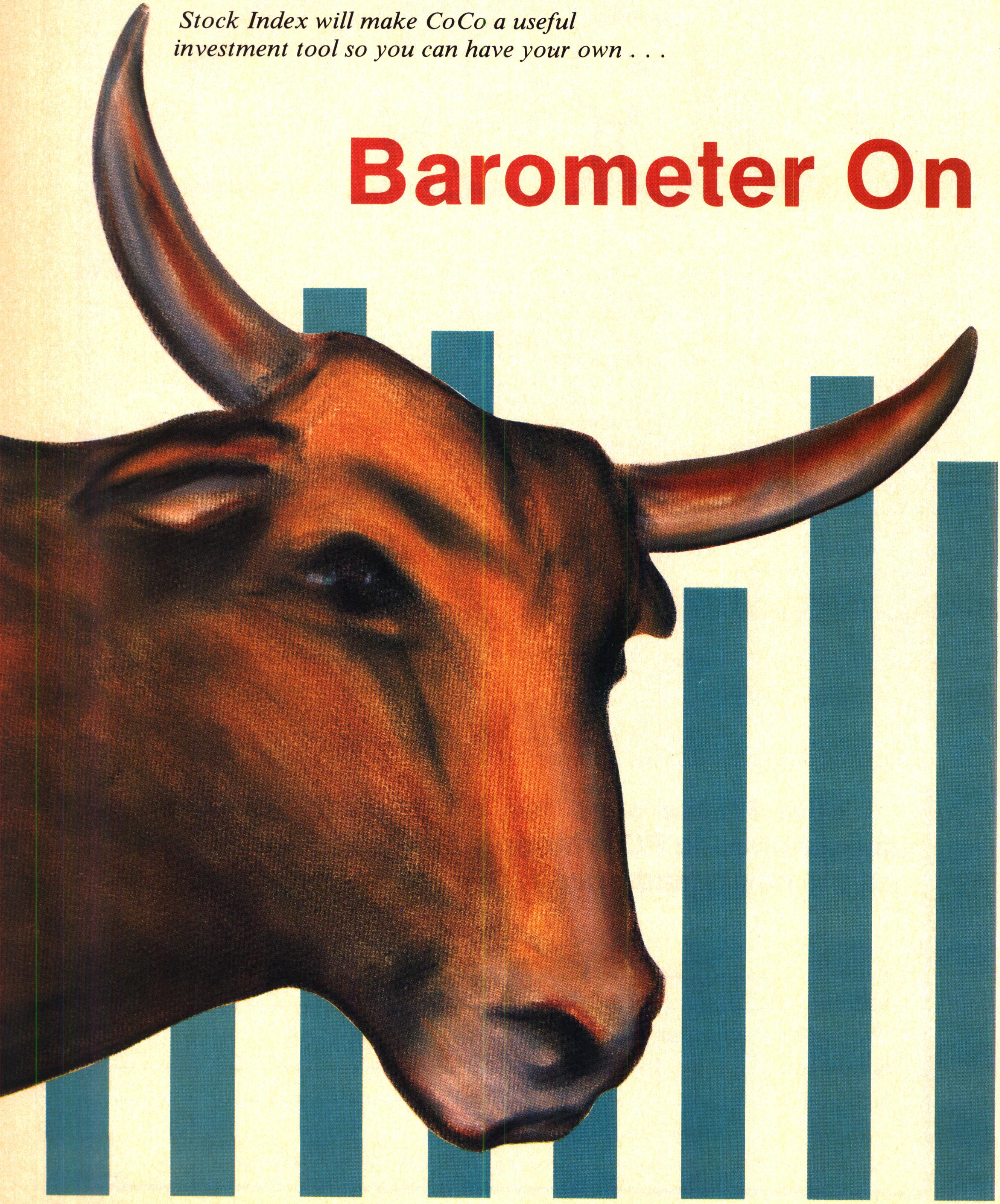
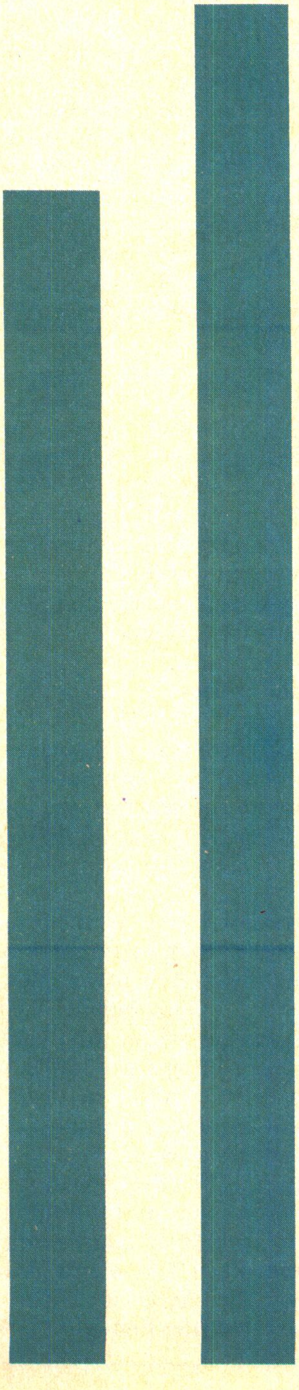
Stock Index will make CoCo a useful investment tool so you can have your own . . .

Barometer On



The Stock Market

By Patrick H. Lowrie, Jr.



You can gauge your own performance in the stock market with *Stock Index*. It works equally well for measuring the performance of mutual funds, bonds or anything where the price fluctuates with time.

Measuring your performance is easy if you just buy some shares and hold them. The price of the stock times the number of shares you hold tells you whether you've made money or lost it.

But, when you buy a few shares of this stock today, a few more shares in another stock in a couple of weeks or months, then sell some shares after another month or so, how can you tell? With some stocks increasing while others are decreasing, determining the net performance can be a chore.

Stock Index will take the work out of it. It doesn't care whether you're buying or selling, or whether you're reinvesting the dividends or taking them in cash. It will faithfully show you not only how you are doing, but it can show how well you would be doing if you had invested differently, or how any group of stocks, bonds, funds, etc., are doing.

It's very important to note here that you don't have to actually buy stock to use this program. On the contrary, this program provides an ideal tool by which you can experiment with hypothetical purchases and sales to evaluate an investment method before you spend any money!

Running the Program

Once the program is loaded, run it. To pass the title, press any key. If you answer 'N' to the query about the printer, the program disables the PRINT commands so you can't inadvertently request a PRINT (which would cause the program to lock up without a printer attached).

Amount Invested

After you have entered the date, the program will prompt "total investment?". Enter the total net amount you have actually (or hypothetically) spent in purchases of shares as of that date. (If you don't know this number, or if you want to just compare stocks, for instance, against a baseline date, see "Determination of Baseline" below.)

If you want to know precisely how your investments are doing, this number should include broker's fees, cost of wiring the money or cost of the certified check, and any other costs immediately associated with the purchase. If your purchase was for less than $1,000, it's more important to include these costs, as they are a larger percentage of the total investment than for larger investments. They are real, however, so to ignore them is to make the picture look (somewhat) rosier than it really is.

If you have sold shares, reduce the total amount invested by the amount of cash you received from the sale (and be sure to reduce the NO. SHARES by the number sold).

Dividends Taken in Cash

Next, the program will prompt "Total dividends taken in cash?". As any dividends you have taken in cash are part of the return on your investment, entering this value will allow the program to more accurately compute your performance. (Any dividends that you have reinvested will increase the number of shares of the stock in

---

(Patrick Lowrie, president of Lowrie Information Systems, Inc., holds a bachelor's degree with special honors in electrical engineering. He has been writing programs professionally and for fun since 1960.)

question, and should be included in the NO. SHARES.)

Table of Entries

Next, the program displays a table of three columns. The first column is for entry of the identifier of the stock, fund, bond, etc. This identifier may be up to eight characters long. An example might be FDM or FREEDOM for a mutual fund named "freedom," or GMC or GENMOTOR for General Motors Corporation.

If you have several different stocks or funds, a list of names and their abbreviations is handy. Press ENTER after entering the name.

The NO. SHARES column is for the number of shares you own (or owned) of that stock or fund on this date. If your investments are in mutual or money market funds, this number should be carried out to three decimal places, for example: 34.567. Press ENTER after entering the number. The cursor automatically moves to the next column.

PRICE is the price per share on this date. Your broker (if you have one) can tell you this price, or you can get it out of the newspaper for this date. It must be entered as a decimal rather than as a fraction, and may be carried out to two decimal places. This corresponds to how the prices are listed today in most newspapers, though they are usually quoted in fractions over the air.

This process is repeated for each stock you own or are analyzing. You may list up to 12 entries. But, what if you have more entries than 12?

This program will let you list as many entries as you wish (I'll explain how a bit later), but they must be in blocks no greater than 12 entries long. When all (or 12) stocks have been listed, press ENTER in the "Stock" column of the next row. If you have listed 12 entries, the correction phase will be automatically entered.

Corrections

The entries will now be relisted on the screen followed by the words CORRECTIONS? (Y/N). If you made a mistake during the entry of the stocks, now is the time you can fix it. In response to your pressing 'Y', the program will prompt ENTER NO. OF LINE TO BE CHANGED. This number must be followed by ENTER.

You can also add stocks by selecting a number higher than those listed. (If you enter a number greater than 12, the program will announce "improper entry," and request "Correction?" again.) That is, if three stocks are listed, you can add another stock by selecting a number larger than '3'. The program will always list the next entry with the next successive number, so, if at the end of a three row entry, you entered a '5', the program would enter a '4' because that is the next number in the series.

"Stock Index doesn't care whether you're buying or selling, or whether you're reinvesting the dividends or taking them in cash. It will faithfully show you not only how you are doing, but it can show how well you would be doing if you had invested differently . . ."

You can also delete a stock by pressing ENTER without any entry in the "Stock" column of the row to be deleted. Following each correction the program will relist all entries followed by CORRECTIONS? (Y/N). You will stay in the correcting mode until you respond to the "Corrections?" prompt with 'N'.

Results

When you have completed the corrections, the program will print the results of the calculation on the screen. The screen will first list the date of this analysis, then the amount invested, dividends taken, and a table of all entries with the value of each entry noted in the right-hand column.

If the total number of entries exceeds six, the program will state at the bottom of the screen PRESS ENTER TO CONTINUE. Pressing ENTER brings up the rest of the data.

At the bottom of the table you will note a row entitled AGG 1. "AGG" stands for aggregate. This row is the one row equivalent to all the other entries. This is the feature of the program that lets you analyze as many investment units as you wish. Before I explain how, note below the AGG 1 row the "total value" of the entries listed, and below that the "Index."

Index

The Index is what this program is all about. If you haven't made or lost a penny, the Index will be 100.00. This means you still have 100 percent of your investment.

If you have made money, the Index will be greater than 100, and the Total Value of your entries may be greater than the amount invested.

Please note, though, if you have taken appreciable dividends in cash, the "total value" number can be smaller than the "invested to date," while the Index is greater than 100. This is because the program includes these dividends in its calculation of the Index, but they do not show up in the values of the investments listed. Nevertheless, if the Index is greater than 100.00, you have made money.

The Index will not be below 100.00 until the value of all your entries plus dividends taken are less than the total amount invested.

Printout

If you answered 'Y' to the "printer connected?" prompt, you will see at the bottom of the screen PRINTOUT (Y/N)?. A 'Y' response to this prompt will result in a dump of the entire table to the printer. Since the printer is not limited by screen size, the complete (up to 12) entries are printed on one table.

Additional Entries

If you answered 'N' to the "printer connected?" prompt, or if you answer 'N' to the "printout?" prompt or at the completion of the printout, the prompt MORE STOCKS? will appear at the bottom of the screen with the (Y/N) flashing.

If you respond with 'Y', the program returns to the stock entry table, but it first enters the AGG 1 row to this new table as entry #1. This includes the total aggregate entries of the first table as the first entry of this new table. As a consequence, the results of these new entries will include the results of the previous entries as well.

By answering 'Y' to the "more stocks" prompt, you can build your total analysis to include as many entries as you choose. Each time a new AGG is calculated, the AGG identifier will increase by one (the first will be AGG

1, the second will be AGG 2 and so on).

Answering 'N' to the "more stocks" prompt will return you to the "entry date" prompt for entry of a new and independent set of data.

Determination of Baseline

You may select any analysis as your baseline by entering '0' in answer to the "total investment" prompt. Doing this will cause the "Total Value" amount in the results table to be the baseline from which subsequent analyses can be based. It becomes 100 percent no matter what value it has. This is a convenient way to determine the performance of a block of stocks, funds, etc., for a period of time following a specific date. Once the baseline value is established, it becomes the value used as the "Total Investment" for future analyses.

Final Note

If you want to go back into the program without losing the data, press BREAK to exit the program, then key in `GOTO 300` and enter. The program will then display the last list of data entered with CORRECTIONS? (Y/N) at the bottom of the screen, and you are back in the "corrections" phase.

Note, however, that in order to change the amount invested or dividends taken in cash, you must either respond with 'N' to the "more stocks?" prompt, or break and rerun the program. In either case, all previous data are erased.

Author's Comment

An enhanced version of *Stock Index* is one item on the menu of investment programs for the serious investor that is soon to be published. These programs are intended to make the CoCo a truly useful investment tool. For additional information about these programs, and for information about a pre-publication offer, write to the following address: Lowrie Information Services, Inc., 17 Lowrie Circle, P.O. Box 0728, Hialeah, FL 33011, phone (305) 557-6651.

Copyright (c) Lowrie Information Services, Inc. 1984

```
200 .......39
300 ......255
440 .......17
END .....204
```

The listing:

```
50 'STOCK INDEX    JUNE 24,1984
100 CLS:PRINT@133,"$$$$$$$$$$$$$
$$$$$$$$":PRINT@165,"$
         $":PRINT@197,"$        S
TOCK        $":PRINT@229,"$
               $":PRINT@261,"$
   INDEX         $":PRINT@293,"$
                    $":PRINT@325,"$
$$$$$$$$$$$$$$$$$$$$$$"
110 PRINT@416,"COPYRIGHT (C) LOW
RIE INFORMATION     SERVICES, IN
```

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```
C. 1984.            ALL RIGHTS R
ESERVED"
120 F$=INKEY$:IF F$=""THEN120
130 DIMS$(13):DIMNS(13):DIMP(13)
:DIMTP(13):DIMK(13):DIML(13):DIM
M(13)
140 CLS:PRINT@195,"PRINTER CONNE
CTED? (Y/N)"
150 Q$=INKEY$:IFQ$<>"Y" ANDQ$<>"
N" THEN150 ELSE IFQ$="Y" THEN PP
=1 ELSE PP=0
180 FORX=1TO13:S$(X)="":NS(X)=0:
P(X)=0:NEXTX:CLS:PRINT"****STOCK
 INDEX CALCULATOR****"
190 LINEINPUT"ENTRY DATE MO/DA/Y
R ";M$:PRINTUSING"TOTAL INVESTME
NT ON %      %";M$:INPUT TD:INPU
T"TOTAL DIVIDENDS TAKEN
  IN CASH";DC
200 DV=TD/100
210 T1=0:G=0:AG=0:V=0
220 CLS:PRINT@6,"STOCK      NO.
 PRICE/":PRINT@46,"SHARES   SHA
RE"
230 IF AG>0 THEN PRINT@64,USING"
 1   %   %     ###.###  ###.##";A
$,MS,PZ
240 FORX=(G+1) TO 12:K(X)=34+32*
(X-G+V):L(X)=44+32*(X-G+V):M(X)=
53+32*(X-G+V):PRINT@(32+32*(X-G+
V)),USING"##";X;:PRINT@K(X),"";:
INPUTS$(X):IFS$(X)=""THEN 260 EL
SE PRINT@L(X),"";:INPUTNS(X):PRI
NT@M(X),"";:INPUTP(X):T1=T1+1
250 NEXTX
260 PRINT@448,"CORRECTIONS? (Y/N
)"
270 Q$=INKEY$:IFQ$<>"Y" AND Q$<>
"N" THEN270 ELSE IFQ$="Y" THEN28
0 ELSE 320
280 PRINT"ENTER NO OF LINE TO BE
 CHANGED":INPUTZ:IFZ>12 THEN PRI
NT@384,"IMPROPER ENTRY":PRINT@41
6,"    ":FORT=1TO350:NEXTT:GOTO3
00 ELSE IF Z>T1 THENZ=T1+1:IFZ>1
2THEN Z=Z-1 ELSE T1=T1+1
290 GOSUB510:PRINT@(34+32*Z),"";
:INPUTS$(Z):IFS$(Z)=""THEN 310 E
LSE PRINT@(44+32*Z),"";:INPUTNS(
Z):PRINT@(54+32*Z),"";:INPUTP(Z)
300 GOSUB510:GOTO260
310 FORX=Z TO T1:S$(X)=S$(X+1):N
S(X)=NS(X+1):P(X)=P(X+1):NEXTX:T
1=T1-1:GOSUB510:GOTO260
320 TV=0
350 FORY=1TOT1:TP(Y)=NS(Y)*P(Y):
 TV=TV+TP(Y):NEXTY
360 TV=TV+DC:IFTD=0 THEN IX=100
ELSE IX=TV/DV
370 CLS:HP=0:G=1:Z=0:MS=0:FORX=1
TOT1:MS=MS+NS(X):NEXTX
380 PRINT#-HP,USING"FOR %      %
";M$:PRINT#-HP,USING"INVESTED TO
 DATE: $######.##";TD:PRINT#-HP,U
SING"DIVIDENDS TAKEN : $#####.##
";DC:PRINT#-HP:PRINT#-HP,"STOCK
      NO.    PRICE  VALUE":PRINT
#-HP,"           SHARES    ($)
 ($)
390 IFNS(G)=0 AND P(G)=0 THEN 44
0
400 FORX=G TO T1
410 PRINT#-HP,USING"%       % ###
#.### ###.## #####.";S$(X),NS(X)
,P(X),TP(X):Z=Z+1
420 IFHP=0 AND Z=6THENG=X+1:Z=0:
INPUT"PRESS <ENTER> TO CONTINUE"
;H:CLS:GOTO380
430 NEXTX
440 A$="AGG":B$=STR$(AG+1):A$=A$
+B$:PZ=(TV-DC)/MS:PRINT#-HP,USIN
G"%      % ####.### ###.## #####
.";A$,MS,PZ,TV-DC
450 IF TD=0THEN PRINT#-HP,USING"
BASELINE IS        $#######.";TV-
DC ELSE PRINT#-HP,USING"TOTAL VA
LUE:        $#######.";TV-DC
460 PRINT#-HP,USING"
 INDEX=  ######.##";IX
470 IF HP=0 AND PP=1THEN PRINT"
  *****PRINTOUT (Y/N)?*****" ELS
E 540
480 Q$=INKEY$:IFQ$<>"Y"ANDQ$<>"N
"THEN480 ELSE 500
490 Q$=INKEY$:IFQ$="" THEN 490 E
LSE 540
500 IFQ$="Y"THEN HP=2:PRINT#-2,"
      *********":G=1:GOTO380 EL
SE 540
510 CLS:PRINT"NO.   STK       NO
.    PRICE":PRINT"
 SHARES   /SHARE
520 FORX=1TOT1
530 PRINTUSING"##  %      %  ###
.###  $###.##";X,S$(X),NS(X),P(X
):NEXTX:RETURN
540 PRINT@448,"MORE STOCKS? (Y/
)":FORT=1TO150:NEXTT:PRINT@448,"
MORE STOCKS? ( /N)":FORT=1TO150:
NEXTT:Q$=INKEY$:IFQ$<>"Y" AND Q$
<>"N" THEN 540
550 IFQ$="Y" THEN 560 ELSE 180
560 FORX=1TO T1:S$(X)="":NS(X)=0
:P(X)=0:NEXTX
580 S$(1)=A$:NS(1)=MS:P(1)=PZ:G=
1:T1=1:AG=AG+1:V=1:GOTO220
```

16K
ECB

Computing Interest Payments

A lesson on how to formulate math solutions

By Steve Blyn
Rainbow Contributing Editor

The most difficult type of math example for many students is often the verbal problem. These are problems that tell a short story and ask a question, and the student must decide how the information given can lead to a solution. Many times, the solutions are not obvious; these solutions become obvious only after much explanation and practice.

It is not usually the math of these examples that thwarts students. The difficulty is in deciding how to solve the problem. The information must be internally processed in a meaningful manner. The child reaches the point where the solution becomes some arithmetic function of the pieces of given information.

There is a unique formula that accompanies each of these types of examples. When the formula is familiar, it is a matter of plugging the numbers in the right places and performing the arithmetic. This is sometimes easier said than done when the child reaches the high school level. It is wise to build a solid foundation early on to make the road ahead a little less painful.

(Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He and his wife, Cheryl, own Computer Island.)

Verbal problems come in an almost endless variety. Among them are distance, mixture, coinage, age, perimeter and interest problems. Each has its own distinctive method of obtaining the solution. Distance problems, for example, use variations of the formula Rate times Time equals Distance.

This article deals with interest examples: One borrows a certain amount of money at a fixed rate of interest for a given amount of time. The problem is to compute the amount of interest that will be charged. The method for computing the amount of interest owed, therefore, is based on the principal, the rate and the duration of time the money is borrowed.

> ***"It is not usually the math of these examples that thwarts students. The difficulty is in deciding how to solve the problem."***

Almost all of us have borrowed money for one reason or another. Mortgages, car loans and even charge cards are forms of lending. Small amounts may be borrowed for a period of a year, however, large amounts are usually borrowed for a period of years. It should therefore be explained to the children that the rate of interest is per year and that amount must be paid for each year of the loan.

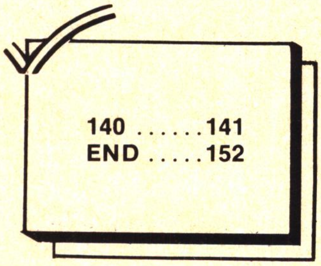
Our program will teach the following formula to compute the total amount of interest owed — Interest equals Principal times Rate times Time (I = P x R x T). We will have a random person (R) borrow a random sum of money (A3) for a random amount of time (M) at a random rate of interest (B3).

These random features can be customized to your specifications as easily as ours. Line 80 chooses any one of six names to be the borrower in each example. It would probably be a better program for your needs if you change the names to those that are familiar to your child or students. Making a program personal always adds a nice friendly quality to it.

Line 100 determines the limit of the principal. A middle level of difficulty was chosen here which you can adjust any way you wish. Line 110 determines the number of years of the loan, and Line 120 determines the rate.

The remainder of the program asks for an answer and compares it to the real answer. Right or wrong is indicated and the correct answer is displayed if an incorrect answer is given. If incorrect, the formula is also given as a gentle reminder.

A report card is given after 10 examples. The student may either end the program at this time or do another round. We hope this program helps clarify an important, yet often confusing, concept for your children.



The listing:

```
10 REM"COMPUTING THE INTEREST -
VERBAL PROBLEMS"
20 REM"STEVE BLYN,COMPUTER ISLAN
D,NY,1985
30 CT=0:CR=0:V=RND(-TIMER):REM
"CT=THE COUNTER AND CR=THE # OF
CORRECT EXAMPLES"
40 CLS5:PRINT@7,"INTEREST EXAMPL
ES";
50 PRINT@27,CT+1;
60 CT=CT+1:IF CT=11 THEN 270
70 R=RND(6)
80 IF R=1THENA3$="  MRS. JONES"
ELSE IF R=2THEN A3$="  MS. SMITH
" ELSE IF R=3 THENA3$="  MR. HYD
E" ELSE IF R=4 THENA3$="  DR. JE
KYL"ELSE IF R=5 THEN A3$="  MR.
GRAY"ELSE A3$="  MS. HUNTER"
90 P$="interest=principalXrateXt
ime"
100 A3=RND(200)*10:'THE AMOUNT
110 M=RND(5):'THE TIME
120 B3=RND(5)+10:'THE RATE OF IN
TEREST
130 PRINT@128,A3$" BORROWED $";A
3:PRINT"  AT ";B3;"%  A YEAR FOR
"M"YEAR";
140 IF M>1 THEN PRINT"S" ELSE PR
INT" "
150 PRINT@256," ":PRINT@224,"
WHAT IS THE TOTAL AMOUNT
OF INTEREST PAID? $ ";:LINE INPU
T J$
160 PRINTSTRING$(64,207);
170 J=VAL(J$):'PLAYER'S GUESS
180 H=A3*B3*M*.01:'CORRECT ANSWE
R
190 IF STR$(J)=STR$(H) THEN PRIN
T@393,"CORRECT !";:CR=CR+1:SOUND
240,3:GOTO230
200 IF STR$(J)<>STR$(H) THEN PRI
NT" THE ANSWER IS ";:PRINTUSING"
$###.##";H;:PRINT" BECAUSE"
210 PRINT"  $"A3;"X"B3*.01;"X";M
;"= ";:PRINTUSING"$###.##";H
220 SOUND15,5:PRINT@66,P$;
230 PRINT@485,"press enter to go
 on";
240 A$=INKEY$
250 IF A$=CHR$(13) THEN 40
260 GOTO 240
270 CLS4:FORT=250TO30STEP10:SOUN
DT,1:NEXTT:PRINT@41,"report  car
d";
280 PRINT@134,"YOUR GRADE IS"CR*
10"%";
290 PRINT@352,"PRESS 'G' TO GO O
N OR 'E' TO END";
300 B$=INKEY$
310 IF B$="G" THEN RUN ELSE IF B
$="E" THEN END ELSE 300
```

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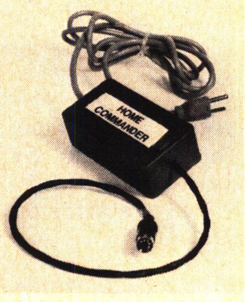

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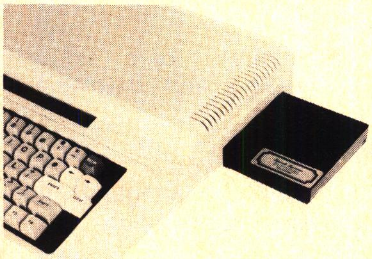

Now your computer will always know the correct time and date. This amazing precision time module is calibrated to the National Bureau of Standards (WWV) atomic clock and you should never have to change it.

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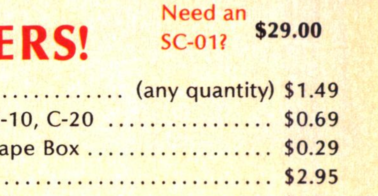

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LOW
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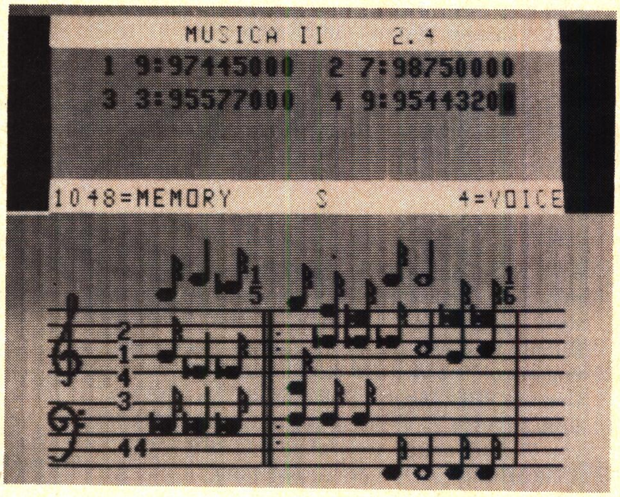
$29.95

Tape or Disk

- Loudness of each voice may be individually specified.
- Memory available is constantly displayed.
- Voice waveshapes may be exchanged between voices at any point.
- Tempo may be specified and may even be altered as the music plays.
- Flats and sharps supported.
- Billions of timbre combinations.
- High resolution graphic display, looks just like sheet music.

- When in stereo mode, music is played through our STEREO PAK (purchased separately).

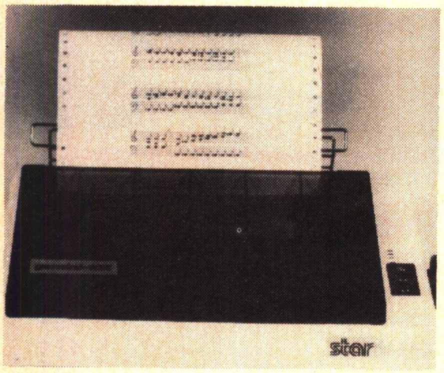


```
        MUSICA II      2.4
  1 9:97445000   2 7:98750000
  3 3:95577000   4 9:9544320

1048=MEMORY      S        4=VOICE
```

- Repeat bars allow repeating of music without re-inserting music a second or third time.

- Voice timbre (waveshape) may be altered by specifying harmonic content just like stops on an organ.
- During editing, voice being inserted is displayed.
- Each measure is numbered for easy reading of music.
- Measure bars aid in reading and developing music.
- Each voice may be visually highlighted for easy identification.



Output music to your printer (Gemini 10X, Epson, R.S. printers, Okidata).

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Stephen Wilson

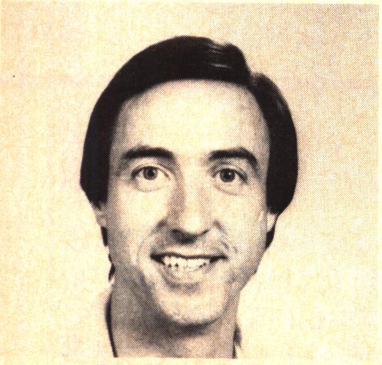
"It's the best four part harmony composer on the market and the most used program in may files."
R.G. Wrights

"Of all the music programs, and I've had them all, there is no comparison in flexibility, simplicity of operation and in the warm vibrant tones that it produces. I went out and spent $700.00 on stereo equipment just so I could more thoroughly enjoy Musica 2 and the Stereo Pak!"
Howard Lentz
TCI Industries

Download music from our BBS or Compuserve

THERE'S MORE

- 4 Voices produced simultaneously
- Input notes from keyboard or joystick
- Play music from your own BASIC program
- Block copy music for easy music development
- 100% machine language so it is lightning fast
- Vibrato effect easily produced
- With STEREO PAK, voices may be switched between left and right speakers as music plays
- MUSICA 2 is 100% software, no need for hardware unless you want music produced in STEREO. In that case, the STEREO PAK may be purchased separately. It's a must for the audiophile!
- Durations include: whole, half, quarter, eighth, sixteenth, thirty second, sixty-fourth, and triplet.
- 30 page manual describes all.



RICH PARRY

'I THOUGHT ONLY AN APPLE SOUNDED THAT GOOD'

That's what I was told after I gave a seminar and demonstration of MUSICA 2 and the STEREO PAK at the Chicago Rainbowfest. I smiled and thanked the young man for the "supposed" compliment, but upon reflection, I became angered by the apparent belief that the CoCo is inferior in this regard. Nothing could be further from the truth.

To help fight this false belief, we've decided to lower the price of MUSICA 2 to help spread the word.

We will also keep the STEREO PAK price at $39.95 and give you a complete refund if you are not 100% satisfied with the STEREO PAK.

NEW! STEREO PAK™ $39.95

Plug this gem into your computer, connect to your home stereo system and sit back and enjoy music realism. The STEREO PAK is a hardware music synthesizer that plays our MUSIC LIBRARY and MUSICA 2 music in stereo. Because it was designed specifically with music reproduction in mind, the sound is superb. The highs are crisp and clear while the bass notes will rattle your walls.

The STEREO PAK is all hardware. It is intended as an enhancement for MUSICA 2 and our MUSIC LIBRARY. Disk owners may use the STEREO PAK with the R.S. Multi-Pak or our Y-CABLE ($28.95)

New!
NOW "PLAY"
AND "SOUND"
COMMANDS COME
THRU THE
STEREO PAK
Requires 64K

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10 HOURS OF MUSIC

BUY 2 GET 3rd FREE

You get over 100 four voice songs with a combined playing time of 3 hours. That's right, 3 hours of music. You won't belive your CoCo could sound so good. To fit over 100 songs required both sides of 5 C-20 tapes and the disk version uses 5 full disks (that's a half box of disks).

A JUKE BOX selection program is included to allow you to select specific songs or automatically play each. These songs are ready to go, you don't need MUSICA 2 or a knowledge of music.

These songs were developed using the best music program available for the CoCo; MUSICA 2. The tunes may be used as source files for MUSICA 2 and changed by the user. When coupled with the STEREO PAK the songs are reproduced in stereo with unsurpassed realism.

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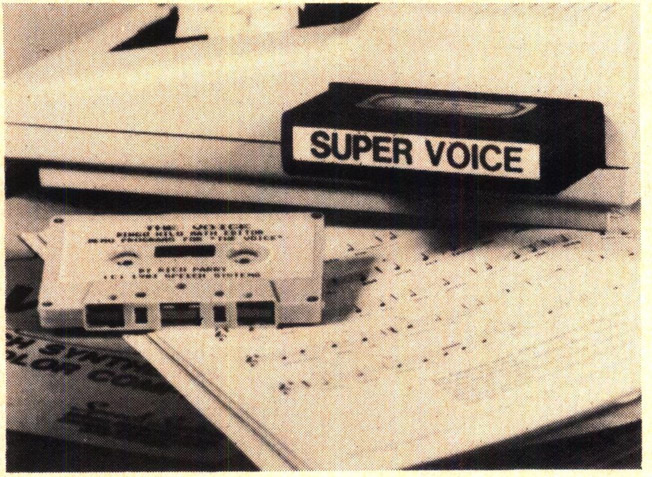

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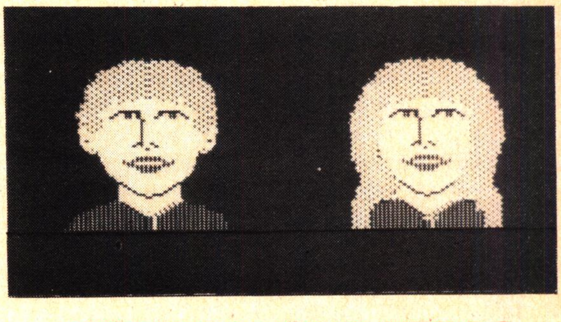

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Is our advanced technology serving as a catalyst for illiteracy?

Reading vs. Computers

By Michael Plog, Ph.D.
Rainbow Contributing Editor

Is there a problem with literacy in this country? I have read that at least 23 million adults are functionally illiterate, and that number is reportedly growing each year. I do not know how "functionally" is being defined, but for the sake of argument, we can accept the figure, or at least the idea that a lot of people cannot read.

It has also been reported that book reading for people under 21 years of age has declined 13 percent in the last five years. So, even if people can read, they choose not to.

National studies have addressed the problem of students not being able to read in school, and even teachers who cannot read. It does seem that this country should have the highest literacy rate in the world, and we should ideally have a literacy rate over 99 percent.

Recently, I overheard someone talking about students' low level of reading, and reasoning that technology is the cause of lack of ability to read. With computers, arcade games and video performances, the argument goes, students do not take the time nor have the desire to read. The lure of the television screen, with its computer generated graphics, is too much competition for books or magazines.

I disagree with this position. There has always been competition with books, including such things as fishing, cloud watching, tree climbing or just plain "hanging around." If we as a nation do not read, the fault lies not in our electronic gadgets, but in ourselves. (My apologies to Shakespeare.)

Current technology may impose many ills upon society, but a lack of reading is not one of them. We may lose our privacy, our dignity and even our definition of "good" taste, but technology will not cause us to lose our ability to read.

Now the microcomputer is but one component of current technology. It, however, is more often accused of causing a lack of reading than some of the other technologies, such as video recorders. It is my contention that current technology (including the microcomputer) will help eliminate illiteracy. It is gratifying to know that others, in positions of prestige and power, share this view.

Last year, Congress requested a study on the future of books, given the electronic methods of access to information. The Library of Congress recently released a report responding to the request.

It is true that technological expansion has "deprived the printed word of its traditional monopoly on access to knowledge, information, and the masterpieces of civilization," according to the study. Losing the monopoly, however, does not mean people have less access to knowledge.

The report goes on to explain that new technologies expand access to the world of books. For example, many classical pieces of literature are currently being reformatted to movie or television productions. These "translations" draw more people to libraries and bookstores to read the original works.

(Michael Plog received his Ph.D. degree from the University of Illinois. He has taught social studies in high school, worked in a central office of a school district, and currently is employed at the Illinois State Board of Education.)

In a more direct sense, the conversion of books and newspapers to microfilm increases the availability of sources of information; sources that are being used by the American public. Computers, naturally, are used to compile and store more comprehensive reference works, and greater detail of information, than ever before.

The report claims that far from being a threat to the printed word, new information technologies promise to aid in the spread of knowledge and the war on illiteracy. In fact, the "culture of the book" benefits from the development of computers, television and even radio.

So, back to the original thought for a moment. On first glance, it may indeed appear that students are not reading as much as in the past, because they have entertainment in their home microcomputers. That position is a simple response to a problem, and does not even stand up against "common sense" arguments.

In order to operate a computer, even a relatively inexpensive, but high powered machine like the Color Computer, a person has to read directions. Also, computers tend to be in affluent homes more than in poor homes, and students from affluent backgrounds usually tend to read better than their peers of lesser economic means.

And, anyone who has had a computer more than three weeks knows that the machine does not reduce paperwork, simply processes paper more quickly. Producers of all that paper have to be able to read it.

It may be true that students today do not read as well as in past generations. However, it may not be true, for several reasons. The most simple explanation for the lack of truth of this assertion is in the numbers and types of students taking tests now, compared with students taking tests 20 years ago.

It used to be that only college-bound students were administered the nationwide testing for college admission. Then, the trend changed to testing almost all students — which could be done easily because of computers. By adding the lower academic students to the group taking tests, the scores have to decline. If scores of less academic students are included in national results, the average (mean) must decrease. In fact, I understand some principals have improved their school scores dramatically by only having selected students take the tests.

In some respects, it makes no difference whether students today can read as well as their counterparts of past years. It is simply unforgivable for any student in America today to not be able to read. The solution to increased literacy is not in abandoning technology, but in using technology to open more doors for students as well as adults. In essence, just what the study from the Library of Congress found is starting to happen. Educators have a responsibility to use all available means to provide reading skills to students.

I am pleasantly surprised at the availability of computer software for education, including programs for reading. A few days ago, a person I work with asked me about educational software for the Color Computer. He has a CoCo, mostly for his daughter's use, but had not purchased many educational programs.

We started going through THE RAINBOW, looking for educational software. In the first 30 pages, we found advertisements from eight companies for educational software. He quit making notes at that point, realizing the abundance of available software. This can be contrasted with just a few years ago, when almost all advertisements were for games.

So, the lack of software is no excuse for not using the computer to help students read. Neither is the argument that computers are detrimental to reading. We must use the computer and other means at hand to improve reading aptitude of students.

I realize that you read, and can probably read well. After all, THE RAINBOW is a print media, and you are reading this article if you got this far. Also, any parents reading this probably have children who can read well — they have access to computers, don't they? Your responsibility, however, does not end with your family. Universal education, as the theory works in the United States, is the job of all citizens.

For anyone interested, a copy of the report from the Library of Congress can be obtained by mailing $2.50 to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Ask for the publication, "Books in Our Future," stock number 052-070-05978-7. If anyone wishes to write to me to share opinions, my address is 829 Evergreen, Chatham, IL 62629.

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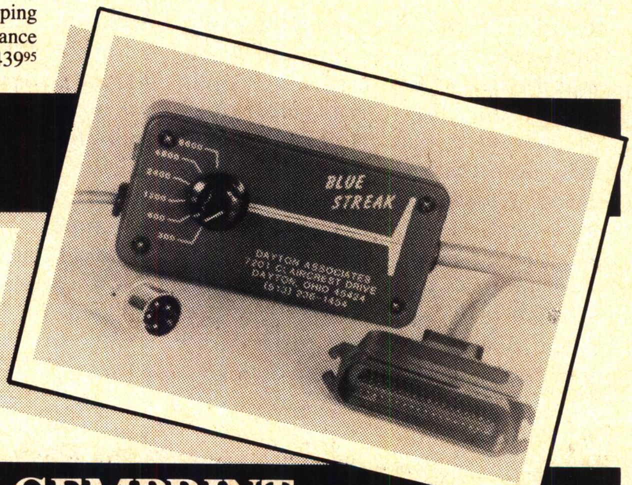
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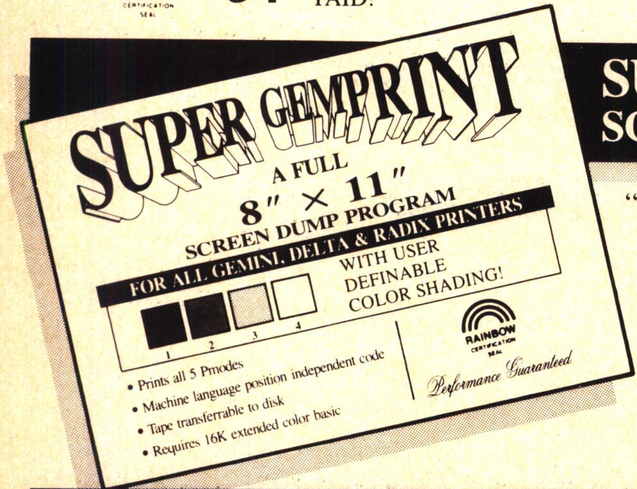
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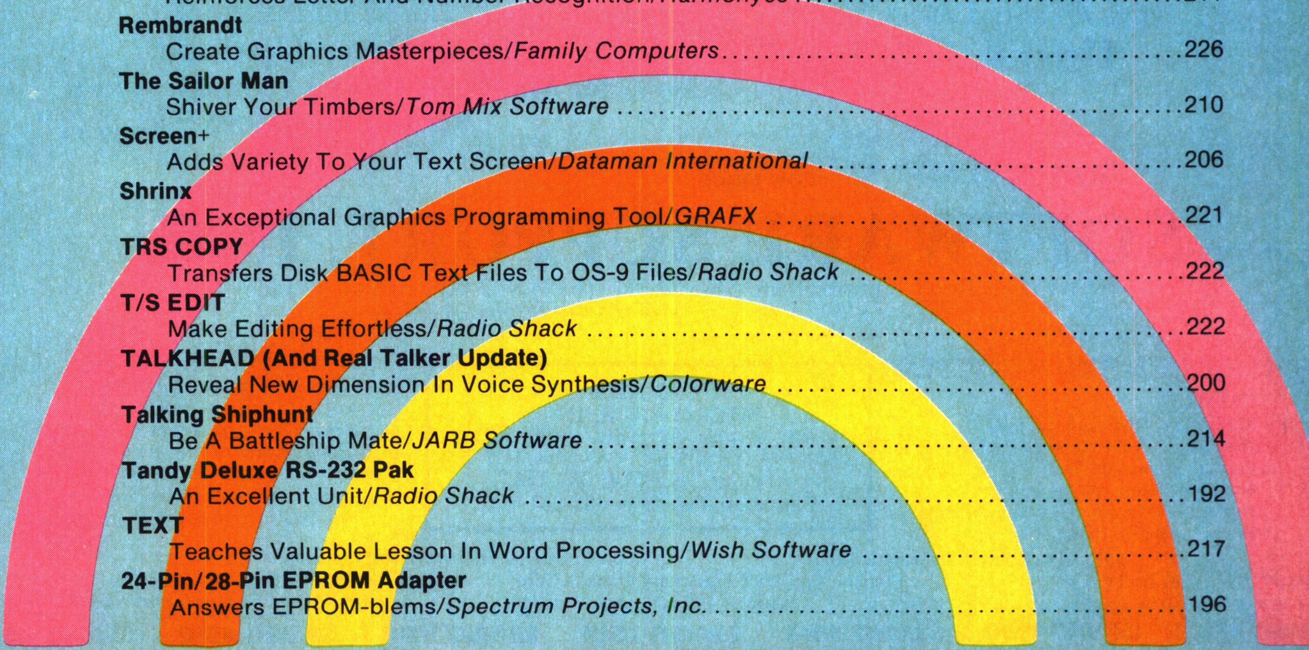

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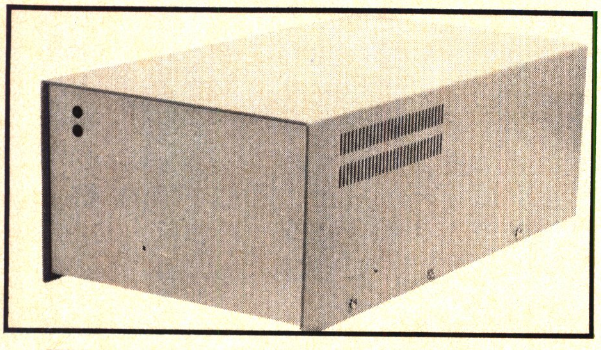

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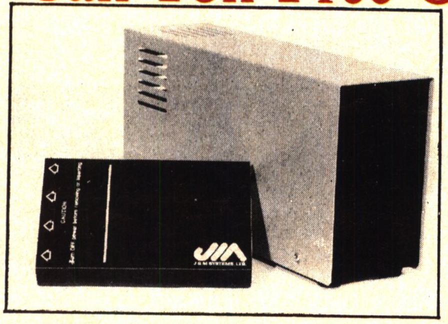

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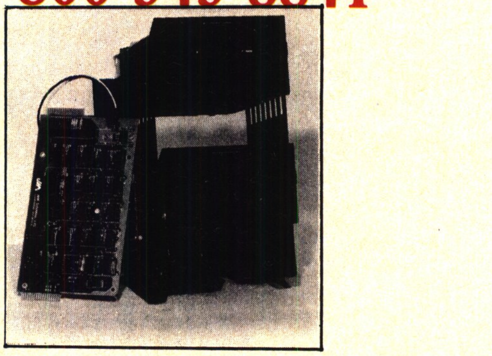

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RECEIVED & CERTIFIED

The following products recently have been received by THE RAINBOW, examined by our magazine staff and approved for the *Rainbow Seal of Certification*, your assurance that we have seen the product and have ascertained that it is what it purports to be.
This month the *Seal of Certification* has been issued to:

Company Commander Version 1.1, a 32K squad level World War II infantry combat game for tape or disk. Game Module #1 comes with House to House map and more than 10 scenarios involving famous European city battlegrounds such as Arnheim, Tobruk and Stalingrad. Combat units include rifle squads, mortar teams, machine gun crews, engineers, leaders and other weaponry of World War II. Design allows incorporation of future expansion modules. Ark Royal Games, P.O. Box 14806, Jacksonville, FL 32238, $29.95

Panzers East, a 32K ECB Simulation that relives the German High Command's Drive on Moscow in World War II. Despite the overwhelming forces you command you must carefully juggle your units: keeping enough at the front to drive back the Soviet army and yet garrisoning adequately captured territory to squelch partisan activity. Finally you must complete your objective before you are taught the lesson so bitterly learned by Napoleon: How cold is a Russian winter? Avalon Hill Game Company, 4517 Harford Rd., Baltimore, MD 21214, cassette $25

Handycode, a 16K ECB encryption program to secure storage of passwords, safe combinations or any top secret such as a surprise party guest list. Key passwords are not saved at sector or bit level insuring examination by unauthorized persons will net only frustration. V. Baumann, P.O. Box 415, Hammond, IN 46325, cassette $18.50, disk $19.50

Quiz Kids, two 16K quiz programs requiring the Color LOGO program-pak. LOGO Shapes for younger children which allows the child to experience an interesting and instructive environment similar to running a program written in BASIC, and LOGO Stars which quizzes older children on displays of five constellations in the northern skies. B & B Software, P.O. Box 210, Jenkintown, PA 19046, either cassette $14.95 or both programs on one cassette $22.50

Congress, a 32K ECB Simulation that has elected you President of the United States. You select a program to get through Congress. You decide which states to influence through pork-barrel legislation. You assign lobbyists to the House or Senate and finally you decide whether to sign a bill into law or veto it. B5 Software Co., 1024 Bainbridge Place, Columbus, OH 43228, cassette $29.95, disk $31.95

Recess Games, an ECB 16K cassette or 32K disk series of four games for children grades two through eight. *TIC-TAC-TOE* encourages children to predict and plan sequential moves; *Number Guess* includes an optional use of a number line which helps younger children determine the answer; *Treasure Hunt* which teaches use of coordinates to find treasure hidden behind a grid; *Masterbrain* which encourages players to consider the many possible ways to arrange specific digits to build numbers. All games are multi-leveled so children of different ages can play the same game. B5 Software Co., 1024 Bainbridge Place, Columbus, OH 43228, cassettes $19.95, disk $21.95

TIC-TAC-TOE, a 16K ECB version of the game offering three levels of difficulty and the choice of opponents, another person or CoCo. Moves made by either joystick or arrow keys. Draco Software, 22 Lassell Street, Portland, ME 04102, cassette $4.95

ZOOKEY, a 32K typing tutor program with adjustable speed and skill levels to encourage beginners or challenge the experienced typist. Features include game-play action and Hi-Res graphics. Mark Data Products, 24001 Alicia Parkway, No. 207, Mission Viejo, CA 92691, cassette $24.95, disk $27.95

CoCo Professional Tax Preparer, a 32K program requiring two disk drives that lets CoCo take the place of your current tax preparer or accountant. After you gather all your tax information together CoCo will interview you in an organized fashion beginning with the heading information and proceeding step by step through all income, adjustments and deductions, and will then compute your tax. After the tax is computed the credits and other taxes sections will be presented for your input. Based on this input, balance owed (shudder) or refund due (sigh) will be computed. Micro Data Systems, 6 Edward Dr., Ashland, MA 01721, disks $149.95

Color Stat, a 16K ECB data analysis system to maintain data files, calculate a wide variety of statistics, display results on screen and list results on line printer. Features include, descriptive statistics, frequency distribution, graphic histogram, correlation statistics, linear regression equation, least squares prediction, matched-pairs t test, scattergram with regression line, multiple regression with two predictors and analysis of variance for up to five groups. Radio Shack stores nationwide, cassette $24.95

Cyrus World Class Chess, a 16K chess challenge under tournament conditions. *Cyrus* can play against itself or replay moves from a finished game. While pondering its moves it can show you the possibilities it is considering. You may take back moves or set up special positions for problem-solving or analysis. When instructed to play "fast" *Cyrus* can't "think" as long about its moves and is an ideal opponent for the beginner. Radio Shack stores nationwide, $39.95

Professor Pressnote's Music Machine, a 32K ECB series of educational activities designed to introduce children to the fundamentals of music. Concepts include the names and locations of the notes on a musical staff, the lengths of various notes and the way notes fit together to form melodies. Radio Shack stores nationwide, cassette $24.95

Electronic Book, that lets you put pages from various programs in. Children touch spots on the pages to advance the program. Radio Shack stores nationwide, $24.95

7 Card Stud, a 16K Simulation of the most popular version of the game of poker. Play against one, two or three opponents, choosing them for their playing styles. Ask CoCo for advice if you're unsure of your next move. Radio Shack stores nationwide, RomPak $24.95

Shamus, a 16K Adventure requiring a disk drive and joystick. You're an intergalactic gumshoe and all-around tough guy armed only with the universally banned Ion-Shivs and your own smarts sent to annihilate that malevolent, murderous stinker, The Shadow. His lair is in another time space guarded by the robodroids, Whirling Drones and Snap-Jumpers. It's dangerous, it can be deadly but that's why they call you *Shamus*. Radio Shack stores nationwide, disk $29.95

The CoCo Tuner, a precision audio tone generator and pitch comparator. Designed to be plugged into the expansion port of the CoCo or CoCo 2, it can aid in tuning a wide variety of musical instruments by providing a graphical display of the pitch of a note, or by precise pitch through the television speaker or cassette output. Features included are easy-to-use manual, single-keystroke commands to advance notes up or down through a chromatic scale and the entire musical scale can be offset uniformly for tuning to a relative standard other than A-440. Accuracy is within .003 Hz at middle C. Real-Time Specialties, Inc., 6384 Crane Rd., Ypsilanti, MI 48197; module and manual $89, microphone with six-inch cord $14, piano tuning kit with wrench, mutes, felt and booklet $27, Michigan residents add 4% sales tax

CoCo Cooler II, a handy gadget to prevent unwanted heat buildup inside your Color Computer to keep things cool and running smoothly. Specify 'D', 'E' or CoCo 2. Spectrum Projects, Inc., P.O. Box 21272, Woodhaven, NY 11421 or P.O. Box 9866, San Jose, CA 95157-0866, $49.95 plus $3 S/H

16K DOS Adapter, an adapter for using 2764, 27128 and 27256 EPROMs in place of your existing ROMs. Spectrum Projects, Inc., P.O. Box 21272, Woodhaven, NY 11421 or P.O. Box 9866, San Jose, CA 95157-0866, $19.95 plus $3 S/H

RAINBOW
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The *Seal of Certification* program is open to all manufacturers of products for the TRS-80 Color Computer, the TDP-100, or the Dragon-32, regardless of whether they advertise in THE RAINBOW. By awarding a *Seal*, the magazine certifies the program *does exist*, but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW'S reviewers for evaluation.

— **Monica Dorth**

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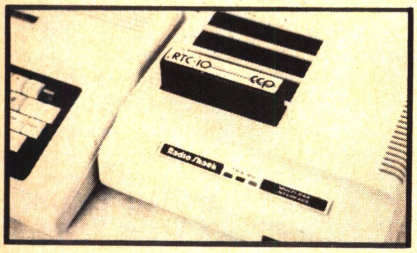

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REVIEWING REVIEWS

CALORIE COUNTER

Editor:

In looking over my review of Draco Software's *Calorie Counter* in the January RAINBOW, Page 220, I find it is possible even to surprise myself.

First, let me say that *Calorie Counter* is the easiest to use and most complete program of its type I have yet come across. As such I can without hesitation recommend it to the casual dieter or anyone interested in keeping track of calorie intake.

Having said that, I would like to amend my introductory line, ". . . just what the doctor ordered." A diet is something most of us take for granted, and, if of normal health and sound body, we can afford to. However, in cases of other than "normal" health (pregnancy, *any* illness, attempts to lose more then a few pounds) an unsupervised diet can lead to serious problems. In these, or any situation where there is any question, no computer program can take the place of a trained health care professional.

If the above is kept in mind, I believe that any user of Draco Software's *Calorie Counter* will find it both easy and satisfying to use and a reasonable value for the money.

Nevin J. Templin
Willingboro, NJ

HANDS ON

Editor:

As an owner of the *Hands On* package reviewed by Mark Williams in the November 1984 issue of THE RAINBOW, Page 206, I agree that it is a fine package. I think that Mr. Williams did a very good job on this review. There is one thing about my *Hands On* package that differs from the copy that Mr. Williams reviewed. I am able to make unrestricted backup copies for my own use using Disk BASIC's `BACKUP0` command. (I used no backup utility.) There are no instructions in the *Hands On* documentation for making a backup, but I tried it and all programs on the *Blackboard* activity disk and the *Color It* activity disk work flawlessly. I agree with Mr. Williams that the inability to do backups for programs for children is a distinct liability, even when free replacements are available. I have two young sons and use only my backup disk while keeping the originals in a safe place. I bought my *Hands On* package from Tandy Home Education in September, 1984. It is in the same packaging as in a Radio Shack store. The version on the "registration for modification notices" is 01.00.00. I presume that Mr. Williams has a different number on his copy.

I hope that my comments will be useful to Mr. Williams and your readers. I commend him on a fine review.

Gail Allinson
Brookfield, IL

BAKERSFIELD KENO

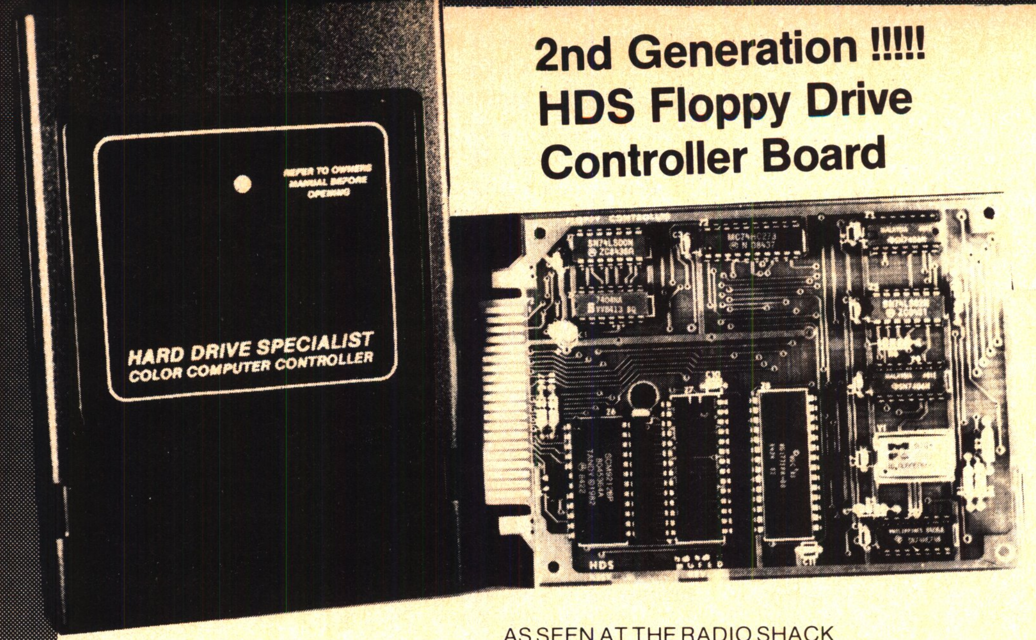
Editor:

I received Michael Nowicki's review the other day concerning my program called *Bakersfield KENO*. I have to admit that I was a little more than just thrilled at his comments considering that [this] is the first commercial program I've attempted.

I just wanted to clear up one little point. The game picks 20 winning numbers "just like Vegas, Reno, Tahoe" and not 15 as stated in the review.

David Seibold
Bakersfield, CA

2nd Generation !!!!! HDS Floppy Drive Controller Board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So what's so new in our second generation? We had a lot of requests for the need to use the lessor expensive 28 pin Eproms. Our 2nd generation controller allows the useage of either (two 24pin ROMS), or (one 24pin ROM and one 28pin ROM). The second feature we added was a technical one and is not apparent to the average user. Western Digital was good enough to manufacture for us a far advanced drive controller chip, called the WD1773FDC. This chip integrates the data separation method within itself allowing the cleanest data transfer to date.

Reduce your I/O errors with the Hard Drive Specialist Floppy Drive Controller for the Color Computer. Gold Edge Card Connectors, Advanced Design, and the absence of potentiometers make this the best board available to date.

Completed and Tested Board with Radio Shack ROM .... (Includes Case, and DOS Instructions)	**$139.**
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Bare Board with instruction manual	**$ 40.**
Parts Kit For Bare Board without ROM	**$ 40.**
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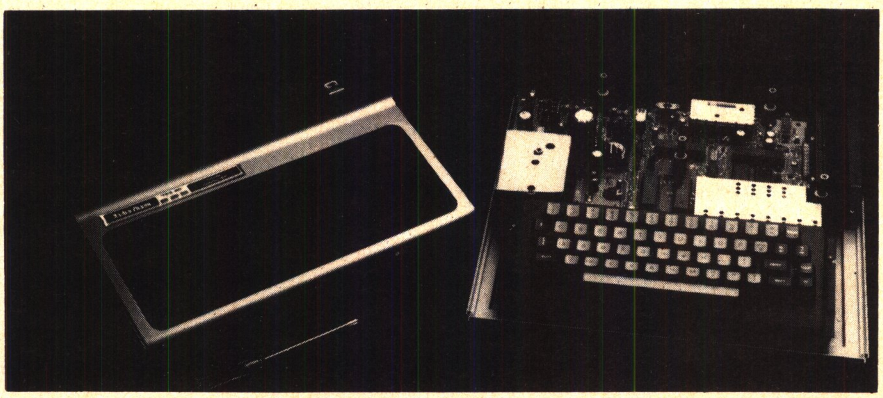
NEW ROM

HDS has licensed the ROM from Radio Shack to be able to offer alternative operating systems pre-blown ready for installation. The first of what we hope to be a wide range of options is ADOS. ADOS is a product of SpectroSytems of Miami Florida and if fully supported by the author. The HDS version of ADOS supports 2 drives, 40 track, 6ms trk-to-trk drives only, either Single Sided or Double Sided. The ADOS package comes complete with original documentation and diskette from SpectroSystems and can be installed in our Drive Controller Board at purchase time for no additional charge.

ADOS/HDS 24 pin ROM .... (useable in all drive controllers on the market)	**$ 50.**
ADOS/HDS 28 pin ROM .... (useable in the HDS 2nd generation board only)	**$ 40.**



Keytronics Keyboard KB500

The Fantastic Keytronic Keyboard is now being manufactured only for Hard Drive Specialist. It is the only keyboard for the Color Computer known on the market that does not use membrane switches. The KB500 uses a capacitance foam switch. This type of switch will never give keyboard bounce and last much longer than all other types. The KB500 is also the only keyboard that will fit all versions of the color computer weather it is a A, B, C, D, E, F, ET, TDP-100, COCO IIA, or COCO IIB. One keyboard fits all with out risk of getting the wrong version, and there is no need to do any modifications to your case. Additional features include a higher spring force on the break and clear key to reduce the possibility of a disastrous key-stroke, sculptured keys, low profile, "pips" on home row keys. The "PF" function key comes with documentation and a sample program. The Keytronics/HDS keyboard list price was $89. when it was offered through Keytronics. **Our price on it is only $69.** plus $3. for shipping.

HARD DRIVE SPECIALIST

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Use our Watts line to place your order Via Visa, MasterCard, or Wire Transfer. Or Mail you payment directly to us. Any non-certified funds will be held until proper clearance is made. COD orders are accepted as well as purchase orders from government agencies. Most items are shipped off the shelf with the exception of hard drive products that are custom built. UPS ground is our standard means of shipping unless otherwise specified. Shipping costs are available upon request.

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Comparable RS-232 Packs: Tandy Deluxe Program Pak And PBJ 2SP-Pak

One of the things that makes the Color Computer so desirable is that you do not have to buy extra plug-in boards in order to make it drive a printer or a modem. The reason for this is circuitry that comes with every CoCo allowing it to talk to the outside world through what is known as an RS-232 port. So why would anyone want to buy such a thing as a plug-in card when the RS-232 port is already built into the computer?

First, the CoCo has only one built-in port. If you need to use both a printer and a modem, you have to either plug and unplug each of them time and again, or buy a hardware device that switches between them. Even with such a switcher, you still are unable to use both at once. And some find the need to switch annoying. So, one reason to buy a hardware RS-232 device is to provide a second port for your computer.

More reasons relate to the nature of the CoCo's built-in port. That port is what we call a "software RS-232." That is, in order to send and receive information through that port, the CoCo must create and analyze the RS-232 signal using cumbersome software that is somewhat inaccurate and, worse yet, eats up a great deal of the central processor's time. If all you need to do is drive a printer or use a smart terminal program at no greater than 300 Baud, this is not a great problem. But if you want to do both at once, or if you want a smart terminal program that functions with true full duplex at 1200 Baud, a hardware UART is required. Due to the limitations of the built-in software UART, it is impossible to write a smart terminal program that functions competely correctly at 1200 Baud with the CoCo's built-in port (Colorcom/E, sold by Spectrum Projects, comes closest to doing this).

SIMON

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Wouldn't it be nice if you could run through a BASIC program, answer prompt after prompt, and then have the same responses generated again with the touch of one key? You can with **SIMON**!

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SIMON is perfect for any type of reporting, file maintenance or any other program that requires a sequence of prompts to be answered each time it's used. This works especially well with our PRO-COLOR-SERIES programs.

Requirements: 64K Color Computer with Disk.

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Visa/MC call: [803] 665-5676—10:00am to 5:00pm EDT.

For those of you using OS-9, there is even more reason to consider buying a hardware RS-232 port. Because the software RS-232 is so time-consuming, if you try to use the power of OS-9 to print out material as a background task while running another program (in effect spooling the printer via OS-9), the other program(s) will run badly, often unusably slowly. But with a hardware RS-232 port, the process of outputting data takes 10 to 100 times less time, and printer spooling can be accomplished very effectively. A hardware RS-232 port is also a must if you plan on having a second user hooked in through a terminal under OS-9.

Of course, you must either be able to write or buy software to use these pieces of hardware. OS-9 users may know by now that the new release of OS-9 from Tandy will now support both the Tandy Deluxe RS-232 Program Pak and one port of the PBJ product (the PBJ 2SP Dual RS-232 Pak) as both are addressed to the same place. PBJ has available a series of patches for OS-9 for both of its ports. Disk BASIC users will be happy to learn that Tandy and others will soon be coming out with disk-based smart terminal programs that can use the hardware RS-232 port. CompuServe's VIDTEX will soon be released in an updated version that makes use of such special hardware. And I am currently beta testing a smart terminal program that uses this hardware. Thus, by the time you read this, even Disk BASIC users should be able to buy software that uses this hardware.

Similarities of the Two Products

Both the Tandy and the PBJ product are similar in size, shape and cost. Both products must be used with an expansion port device if you want to use them with a disk drive. Both have a hardware RS-232 port addressed at $FF68 that uses the same 6551 ACIA chip to create the port. Both have the address of the port fully decoded, meaning that the port will work regardless of which slot you put them in your expansion device and regardless of which slot you select. Both products have the capability of placing a ROM or EPROM on board the device, though in both cases the EPROM on the device is addressed using the *CTS line, meaning that in order to use any software in the EPROM you must select the slot the device is plugged into. Both products work as advertised. Both are designed to provide the required positive and negative RS-232 voltages using as input only the 5-volt line. That is, both will work when plugged directly into a CoCo 2. Full technical information, including schematic diagrams, is available for both from their respective suppliers. Both Tandy and PBJ are to be commended for this policy.

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- Un-DISK should be in the library of every serious CoCo user even if you own a disk says Frank J. Esser, independent reviewer for RAINBOW Magazine!

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Differences Between the Devices

Unlike the PBJ product which comes only with traces provided for soldering in an EPROM socket, the Tandy product comes with a terminal program on a 24-pin, 8K by 8-socketed ROM inside the device. This might seem to be a tremendous advantage, until you realize that the program supplied cannot use the disk drive. This is a serious limitation, because of its lack of support for disk systems and its overall poor structure and quality, I would advise potential buyers to ignore the supplied software in the ROM in the Tandy Pak, and look at that pack as solely a hardware port without software.

When one does that, the Tandy product doesn't look bad at all. The RS-232 port it provides connects to the rest of the world using an industry standard DB 25 connector, not the CoCo 4-pin DIN connector. The PBJ unit uses the "CoCo standard" 4-pin DIN connectors. In addition to the signal ground, transmitted data, received data, and carrier detect (DTR) line available with the CoCo's built in, or with the PBJ's port, the Tandy product also provides CD (Pin 8), CTS (Pin 5), DSR (Pin 6) and TD 8 (Pin 2). Thus, it represents a fuller implementation of the RS-232 protocol. If you wish to program an application that will need to use those other lines, your only choice in hardware packs is the Tandy product.

On the other hand, you can use your existing modem cables with the PBJ unit. And I know of no currently existing or proposed CoCo software that uses the extra lines provided by the Tandy Pak.

The Tandy unit provides about plus and minus 10 volts on its RS-232 lines. The PBJ unit provides about plus and minus 4.7 volts. Both figures are within specifications for the industry standard for the RS-232 protocol. But because the Tandy unit puts out somewhat more voltage than the PBJ unit, it may be preferable for those few applications where you want to run 50 or more feet of RS-232 cable. I must add that I know of few users who need more than 10 feet of cable.

Assuming one does not use the ROM supplied with the Tandy unit, one has a 24-pin socket to play with. The PBJ unit is designed to support a 28-pin socket that you solder in. If you are a hardware hacker, this means that you can put up to a 16K by 8 (27128) EPROM in the PBJ unit, whereas the ceiling on EPROM size with the Tandy unit as supplied is an 8K by 8 (68764) EPROM. You really should call PBJ if you plan to use the traces provided for the socket. There are a few details of how to wire it that you should be aware of, depending on which EPROM you want to use.

Since many Radio Shack Computer Center employees know little about the Deluxe RS-232 Program Pak, it's rather hard to get good information on how to use it. PBJ, in my experience, is readily available to aid its customers with prompt and knowledgeable advice. The folks at PBJ are always up to date on what software — both third party and from Tandy — works with their products.

Hackers will be delighted to learn that PBJ makes the 2SP available as a bare board with documentation. The price of this is $19. But be warned: While the circuit is not very complicated, and all needed information is present, this is no Heathkit! You need some experience in electronics if you want to tackle the bare board. I built two of them, so I know! If you do decide to get the bare board, be sure to call or write PBJ for the latest revision of corrections to be made to the board. If you plan to wire up the EPROM socket, this is especially important. Purchasers of the assembled and tested unit need not worry about this, as all my reports indicate the units ordered have arrived in excellent working condition.

I've saved the biggest difference for nearly last. While the Tandy Pak provides only one hardware RS-232 port, the PBJ unit gives you two for almost the same price (only $10 more)! One port is addressed to the same place as Tandy's ($FF68), and should run with all software designed to work with the Tandy unit. The second port is addressed just above it starting at $FF6C. To use the second port as a printer port, you'll have to alter the wiring of the busy line from your serial printer, as PBJ uses the "CD" pin of the port as its busy detect, whereas the CoCo proper uses the "receive data line," instead. If you are using the PBJ C-C Bus expansion port device as well, PBJ tells you how to "strap the interrupt lines" to use its device under interrupt control. This option (not available to Tandy Multipak users) is useful to folks using a multi-user OS-9 system on the CoCo, but for little else. Using this option requires significant hardware and software experience. PBJ also sells driver modules for the 2SP to be used with OS-9.

Recommendations

It's not an easy choice between these two excellent units. If you are sure you'll only want one hardware port forever, then the Tandy Deluxe RS-232 Pak is a good choice. It costs $10 less than the PBJ product and is available at Radio Shack. But, if you are running OS-9, or if you're a hardware and/or software hacker, you may do well to get the PBJ product, because of the extra flexibility offered by having two, rather than one port.

(PBJ, Inc., P.O. Box 813, N. Bergen, NJ 07047, PBJ 2SP-Pak, $89.95; Radio Shack stores nationwide, Tandy Deluxe Program Pak, $80)

— Marty Goodman

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24-Pin/28-Pin Adapter Answers EPROM-blems

We will now call together the monthly meeting of the Hardware Hacker's Society. First, we will have old business.

"Has anyone found a good source of 68764 EPROMS? All I can find for a reasonable price are 2764s."

"How about a way to speed up my 6 ms disk drives?"

"I sure like Spectrum DOS, but I can't run some machine language games."

"How about new business?"

The chairman of the society, Bob Rosen, addresses the meeting.

"I have the answer to all of these problems — 24-Pin/28-Pin EPROM Adapter from Spectrum Projects."

Meeting adjourned so we can all go home and try the new product.

The 24-Pin/28-Pin EPROM Adapter is not fancy. All it consists of is two sockets connected by a 3-inch piece of ribbon cable. One male socket plugs into the existing ROM socket in your disk controller, or your BASIC socket if you wish. The other end of the cable has a 28-pin socket that is adaptable to a 2764 (8K x 8), 27128 (16K x 8), or 27256 (32K x 8) EPROM. Address lines A13 and A14 are separated from the rest of the cable such that if an EPROM greater than 8K is used you can bank select the portion of the EPROM you wish to use.

What's the most practical use for this device other than being able to use the less expensive 2764 EPROM? Well, Bob sent us a 27128 EPROM already mounted on the board that not only has Disk BASIC, but Spectrum DOS as well. They are selectable by a small switch on the side of our disk controller. Another use that comes to mind is to switch between BASIC 1.1 and 1.2. If you have access to 27256 EPROMs you could select between four different DOSs.

The adapter kit comes with adequate instructions. For a 2764 EPROM, no additional wiring is necessary. The 27128 and 27256 EPROMs require a small switch (two for the 27256) to allow bank selection of the memory you wish to use.

What if I want Disk BASIC and Spectrum DOS on a 27128 EPROM? With a proof of purchase of a Disk BASIC ROM, and Spectrum DOS, Spectrum Projects (in San Jose only) will burn Disk BASIC and Spectrum DOS on an EPROM for an extra $39.95. Contact Spectrum Projects for specific details. As shipped, you will have to supply your own EPROMs.

If you've ever tried to make an adapter socket to convert your CoCo for 2764s, I think you will like this gadget. In my opinion, it will save you time and money. No more burnt fingers, or melted sockets, trying to make your own.

(Spectrum Projects, Inc., P.O. Box 9866, San Jose, CA 95157-0866 or P.O. Box 21272 Woodhaven, NY 11421, $19.95 plus $3 S/H)

— Dan Downard

Inspect Your Programs With *BASIC Searcher*

BASIC Searcher is a machine language utility that searches through the lines of your BASIC program for any selected string of characters. The program can easily find variables or key words and phrases. It allows you to find your way through large programs looking for key elements.

BASIC Searcher operates from protected high memory and is called by a simple `EXEC` command. The program searches for the string of characters which you assign to the BASIC variable SF$. You specify the line to start the search by assigning the line number to variable SL. Finally, you can specify output to your printer by setting SP=1, or direct the output to the screen with the default SP=0.

The program is supplied on tape for a 16K Color Computer. Simple instructions show you how to load the position-independent program for your particular memory size. The program is easily backed up to disk or tape. A two-page description of the program's operation accompanies the tape.

Typically, you search a BASIC program by typing in the simple commands `SP$=''STRING:''SL=0` (and optionally SP=0 or 1) followed by `EXEC`. The program then scans the BASIC text for the first occurrence of the "string" characters. The program presents you with the BASIC line containing the string. You then have the choice of pressing 'N' for the next occurrence, pressing 'R' for the rest of the occurrences, or 'X' to exit the command.

BASIC Searcher has several uses beyond simply finding a single word or phrase. The program can be used to list all `DATA` statements in a program by using `DATA` as a search string and pressing 'R.' Another simple application is to list all `REM` statements in a program as a means of documentation.

The program does its job precisely as specified. It doesn't miss any combinations of characters; I was unable to find any technical flaws.

If you compose programs using a typical word processor or screen editor, these search features may already be available to you. But, for many beginning programmers, this search feature may be the answer to an unruly `LIST` command supplied with your built-in BASIC editor.

(Color Computer Utilities Unlimited, 3907 Bethel Rd., Boothwyn, PA 19061, 16/32K, tape or disk $19.95 plus $2 S/H)

— Stuart Hawkinson

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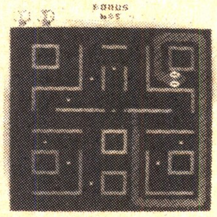

BUZZWORM

This one will drive you nuts. Guide the snake around the screen eating the snakebait for points; but don't bite yourself! Lots of fun awaits you with this one.

REQUIRES 32K & JOYSTICK
TAPE $15.95
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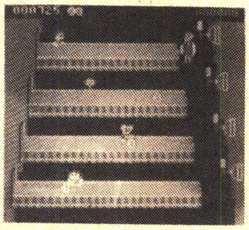
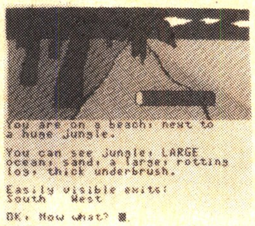


BREWMASTER

Move along the end of the bars serving beer to your thirsty customers. Watch for falling glasses and rowdy customers. Loads of fun.

REQUIRES 32K & JOYSTICK
TAPE $14.95
DISK $17.95



```
You are on a beach; next to
a huge jungle.

You can see jungle, LARGE
ocean, sand, a large, rotting
log, thick underbrush.

Easily visible exits:
South   West

OK, Now what? █
```

BLACKBEARD'S ISLAND

A brand new high res graphic adventure. This one will blow your socks off! Wander around Blackbeard's Island being ever mindful of the hazards while your lust builds for Blackbeard's buried treasure. T'aint easy, matey!

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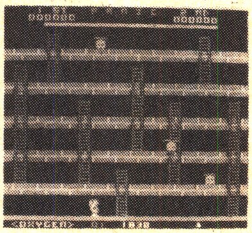
DISK $19.95



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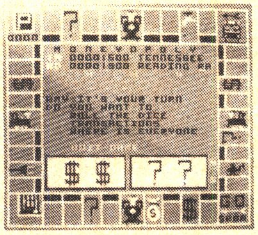

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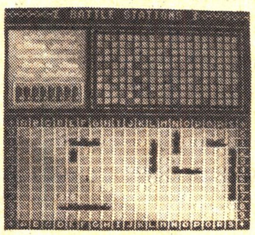

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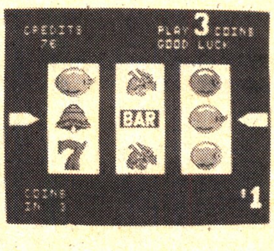

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Have you ever wanted to bring Las Vegas home with you? Now you can! Six different games in this package: Blackjack, Keno, Poker, plus three slot machine lookalikes. You'll swear you are at the table or the slots when you see the outstanding graphics we have created.

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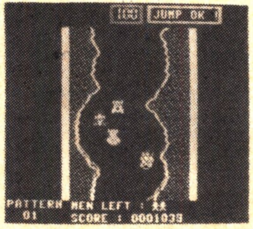
DISK $27.95

6 games



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Polish Appearance Of Cassettes With *Cassette Box Insert Maker*

Cassette Box Insert Maker is a very friendly, easy-to-use program that will help make attractive inserts for the hard boxes your cassettes are kept in. Using this program, you can make a label with 13 lines of text on the front, four lines on the back, and two title lines for the edge of the box. To use the program you need at least a 16K Color BASIC CoCo, tape or disk system, and a printer.

There are three pages of documentation with this program. The documentation is well-written, but the program is so easy to use you probably won't need it after your initial use. Once *Cassette Box Insert Maker* is up and running, the main menu will give you nine options. The first three options: DO FRONT, DO BACK, and DO TITLE, allow you to create the text for your insert. The next three: EDIT FRONT, EDIT BACK, and EDIT TITLE are for editing the text. The last three options will allow you to either PRINT INSERT, ERASE MEMORY or SAVE/LOAD DATA.

Text is entered one line at a time. Each line can hold 39 characters. If you want, each line can be automatically centered. When this is done you are only allowed 38 characters per line. *Cassette Box Insert Maker* uses a line editor and if a change needs to be made in a given line, the entire line must be changed. Up to nine inserts can be made at a time, if you wish, when in the print mode.

One of the more obvious ways to use this program would be to make an insert listing all the programs you have on a particular cassette along with the counter numbers. I find the index provided with RAINBOW ON TAPE is easy to get misplaced, etc., so the first thing I did with *Cassette Box Insert Maker* was to make an insert for my September RAINBOW ON TAPE. The result is very impressive. Below I have included an illustration of what a finished printout looks like.

Cassette Box Insert Maker is published by CoCo Freeware Clearinghouse, so to get a copy just forward a blank tape or formatted diskette along with a self-addressed, postage-paid return mailer to CoCo Freeware and request program number 801A (the documentation program). Disk users should also request program number 801B, Extended BASIC users, 801C, and Color BASIC users, 801D. There is no purchase price, but after receiving and using the program, you can send a contribution.

If you have a lot of cassettes stashed away in hard boxes, this program would be an excellent addition to your library.

```
:------------------------------------------------------------------: < CUT

  NAME        CTR#       NAME         CTR#
CLOCK         021   :  DATABASE       113
GOLDPILE      037   :  BYTMASTR*      122
MCQUIZ        048   :  SCRAMBLR       125
PRTVII        059   :  MADADDER       135
PRTGEM        068   :  ABC GAME       153
PATCH10*      077   :  AUDIOSPL       173
PATCH11*      081   :  WORDLOAD       187
DATELOAD      085   :  GEO GAME       196
MYSTERY       090   :  MATHDRIL       219
CALENDAR      108   :  CALGEN         237

:----------------------------------------------------------------: < FOLD

                      RAINBOW ON TAPE
                      SEPTEMBER 1984
:----------------------------------------------------------------: < FOLD

                  THIS TAPE PROPERTY OF:
                    MICHAEL K. HUNT
                 1467 CASSETTE AVENUE
                DISKETTE, INDIANA 01010

:------------------------------------------------------------------: < CUT
```

(The CoCo Freeware Clearinghouse, P.O. Box 1084, Morgantown, WV 26507)

— Michael Hunt

THE OTHER GUY'S Software

KEEP - TRAK "DOUBLE-ENTRY" General Ledger Accounting System Reg. ~~$60.95~~ — ONLY $19.95

"Double-Entry" General Ledger Accounting System for home or business: 16k, 32k, 64k. User-friendly, menu driven. Program features: balance sheet, income & expense statement (current & 'YTD'), journal, ledger, 899 accounts & 2350 entries on 32k & 64k (710 accounts & entries on 16k) disk only. Version 1.2 with screen printouts. For upgrade return original disk & $5.00. 1.1 Rainbow Review 9/84

"OMEGA FILE" Reg. ~~$60.95~~ — ONLY $14.95

Filing data base. File any information with Omega File. Records can have up to 16 fields with 255 characters per field (4080 characters/record). Sort, match & print any field. User friendly menu driven. Manual included (32k/64k disk only).

"A M T" Reg. ~~$29.95~~ — ONLY $14.95 Rainbow Review 10/84

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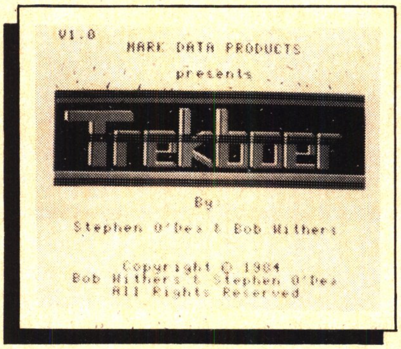
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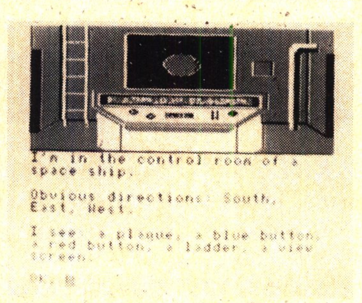
I'm in the control room of a space ship.

Obvious directions: South, East, West.

I see: a plaque, a blue button, a red button, a ladder, a view screen.

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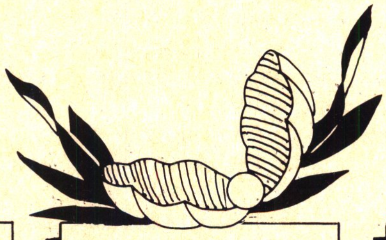

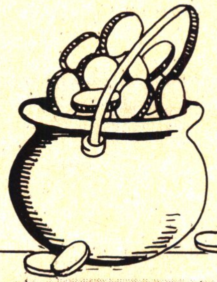

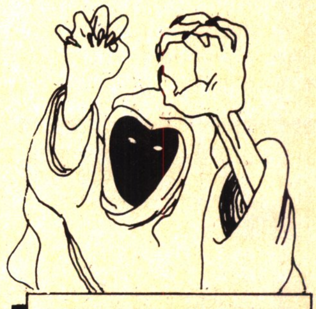

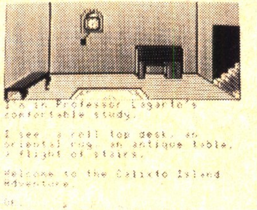
I'm in Professor Lagarto's comfortable study.

I see: a roll top desk, an oriental rug, an antique table, a flight of stairs.

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OK.

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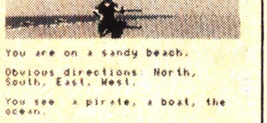
You are on a sandy beach.

Obvious directions: North, South, East, West.

You see: a pirate, a boat, the ocean.

OK.

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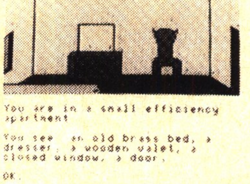
You are in a small efficiency apartment

You see: an old brass bed, a dresser, a wooden valet, a closed window, a door.

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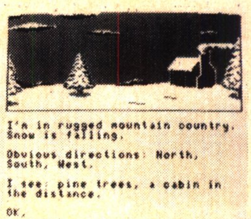
I'm in rugged mountain country. Snow is falling.

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I see: pine trees, a cabin in the distance.

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TALKHEAD And *Real Talker* Reveal New Dimension In Voice Synthesis

By Kenneth D. Peters

Not only can your CoCo have a voice, but a realistic, masculine face to go along with it! Colorware has an animated "Talking Head" program that uses high speed, Hi-Res graphics to create a realistic audio-visual simulation. *TALKHEAD* requires a 64K CoCo and the Colorware *Real Talker* voice pak, but the combination may be hard to beat!

I used both the cassette and disk versions of *TALKHEAD* and found no difference other than speed of loading. Disk users simply insert the disk and run *TALKHEAD* (a BASIC loader program); cassette users `CLOAD` and `RUN`, which takes four minutes longer. The rest is automatic. Three machine language modules are loaded and executed, apparently containing an English text-to-phoneme code translator, the graphics for the head, the movement of eyes, mouth and jaw, and the Colorware logo. Colorware has its own unique audio-visual logo presentation that can't be missed! When the logo is finished, the *TALKHEAD* face appears and says "Talkhead ready."

At this point, "Talkhead" is ready for anything you care to do next. You can experiment with typing various words and phrases for Talkhead to say, write a program and come back to Talkhead, or load programs from tape or disk that already utilize Talkhead's ability. A demo program is provided on both disk and cassette versions called *Daisy*. Remember the song "Daisy, Daisy, give me your answer true . . ."? Well, I must have been half crazy for running the demo so many times! `RUN ''DAISY''` gives a fairly good rendition of the song done by none other than Talkhead himself — I was impressed by both the audio and the visual achievement of *TALKHEAD*. It's a simple song, and it's not perfect, but I've heard worse singers. The Talkhead face seems so life-like I caught myself following the movement of his eyes and mouth just as I would if listening to another person. The three-dimensional quality graphics of the head combined with the appropriate movement of the eyes, mouth and jaws during synthesized speech is quite realistic and well-done.

Daisy demonstrates what can be done with *TALKHEAD*. But more importantly, a look at the program also shows how easy programming Talkhead can be in BASIC. Two new commands are available: SAY and PITCH.

SAY is very similar to the `PRINT` command. Assuming *TALKHEAD* is loaded and ready, you can simply type: `SAY ''HELLO. I AM MR. TALKHEAD''` (and press `ENTER`). The screen immediately changes to Hi-Res graphics, filled with the life-like three-dimensional figure of Talkhead, and he begins talking. When he's through talking, the graphics screen disappears and you are returned to the text screen. Talkhead always appears on the screen automatically whenever he has something to SAY.

Talkhead speaks words or phrases in the immediate mode or within a program. Either way, four rules must be followed:

1) SAY must be the only command on a program line. No other commands, functions or statements are allowed on the same line.

2) You cannot use string manipulation, for example SAY (A\$+B\$), within a SAY statement.

3) The length of the expression following the SAY command is limited to 232 phonemes or approximately 35 words.

4) Numeric variables must be converted to string variables first if you want to SAY the numeric variable.

All the rules are simple to follow and pose no problems, especially if you are beginning to write a program from scratch.

A little extra work may be required, however, to convert one of your existing programs for use with *TALKHEAD*. Putting *TALKHEAD* to a more practical use, I modified a spelling program I had written using the *Real Talker* with the old text-to-speech translator software, in which U=USR(A\$) had to be used everytime you wanted the value of A\$ spoken. *TALKHEAD* uses the new "enhanced" software for the *Real Talker*, which simply uses SAY A\$ whenever you want to have the value of A\$ spoken. (This

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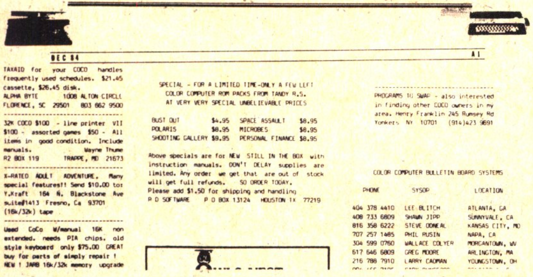

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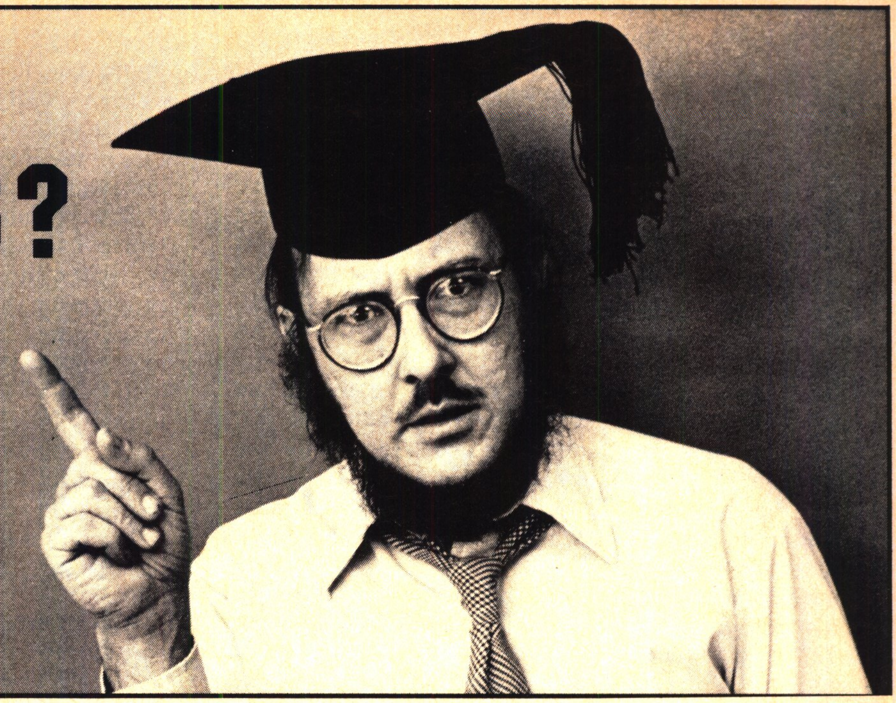

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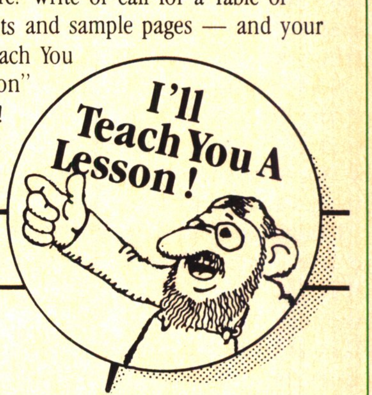
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software has been available since about May 1984.) So, if you have been using the new, improved software for *Real Talker*, you should find *TALKHEAD* can be used immediately without any modification of your programs. I, on the other hand, had to substitute the new syntax (SAY A$) for the old syntax (U=USR(A$)). Being in the habit of writing programs with multiple command lines, I soon found there was more to do than simple substitution. After making the necessary substitutions, each multiple command program line with SAY had to be broken away from the sequence and placed on a separate line by itself. It took a little more work, but the end result was worth it.

My son, aged 7, had used the old spelling program (using the voice synthesizer without *TALKHEAD*) extensively in first grade last year. He thought it was really neat to "see someone" on TV giving him his spelling words! My older daughter, aged 10, agreed. Even my preschooler wanted Talkhead to do her spelling words, (she doesn't have any!). But she is satisfied with just being able to type in letters and words she knows to see Talkhead speak. She is in speech therapy, so I hope to use *TALKHEAD* and the *Real Talker* to help her.

I spent a lot of time talking about SAY and the use of one command line, but it's an area of interest that must be considered more by those people who purchased *Real Talkers* prior to May 1, 1984, and consequently might demand modifications to their existing programs in order to incorporate *TALKHEAD*.

The second rule states you cannot manipulate strings within a SAY command, for example: `SAY A$+B$`. You can issue the command SAY A$ for any value of the string A$ just as well as `SAY ''THIS IS THE VALUE OF A$''`. Manipulations have to be done prior to wanting to say the final result: `C$=A$+B$` then `SAY C$`.

A single SAY line is limited to about 35 words or 232 phonemes. When you think about it, that is anywhere from four to six lines of text on a standard CoCo screen. If that's not enough, you can use multiple SAY lines (many program lines with one SAY command) or `READ` in the string variable within a loop.

SAY requires a string format, thus either a string variable or the text within quotes is required. Therefore, if you want to SAY a numeric variable (for example the value of X), you must first convert the numeric variable to a string variable using the `STR$` function in BASIC.

I mentioned earlier that there were two new commands to use *TALKHEAD* in BASIC. The other command is PITCH. *TALKHEAD* was programmed to "simulate" singing "Daisy" by the use of the PITCH command. PITCH, which can be abbreviated PI on a command line, varies the pitch of the phonemes, words or phrases following the PITCH command. The value of PITCH remains in effect until a new value is issued. If none is issued the default value is 1. Pitch levels available are 0, 1, 2 and 3, with zero being the lowest and three being the highest.

Intrigued by the demo song, I just had to try my hand at composing. Well, actually I didn't compose it, but I programmed Talkhead to sing it for me. Ten to 15 minutes of programming had Talkhead singing "Mary Had a Little Lamb."

TALKHEAD is really the "enhanced" *Real Talker's* machine language text-to-speech translator combined with the digitized Hi-Res graphics of the head, so up to now anything other than graphics that has been said about *TALKHEAD* also has described the "enhanced" updated *Real Talker* software. A few additional comments about *Real Talker* are necessary here to point out other improvements and additions to it since my original review of it appeared in the July '84 RAINBOW.

Perhaps the most noticeable difference is the increased ease of use for the BASIC programmer. There are no `DEFUSR` or `USR` statements to worry about. In making the *Real Talker* extremely user-friendly, only one thing is left for you to remember: You must `LOAD` and `EXEC` the *Real Talker's* translator utility software first before you load another program or start programming! The utility automatically takes care of the rest, relocating itself and providing three new commands for you to use in BASIC: SAY, PITCH and CONVERT. The first two commands have already been discussed. CONVERT creates a stand-alone, talking BASIC program that no longer requires use of the machine language translator program. In other words, plug the voice pak in, load your CONVERTed BASIC program and it talks! All program lines with SAY literals (e.g., `SAY ''Hello''`) in your program will be converted to stand-alone talking lines.

Among other improvements is the Phoneme Editor now has an improved and expanded Help screen, and the translator now recognizes and understands (pronounces) dollars and cents whenever a '$' is encountered. Finally, *ASCITALK* has been added to the *Real Talker* support software. This program will recite any ASCII file, from a word processor or a terminal program, line by line!

I can't think of anything I don't like or would add to the programs, nor have I found any faults with the documentation. Documentation for both *TALKHEAD* and the enhanced *Real Talker* seems to be quite thorough. I checked every sentence and tried every example. Both documentation booklets were extremely well-written with easy-to-understand explanations and examples. These programs were a pleasure to use in BASIC.

The cassette version of both programs can be transferred to disk should you upgrade to disk. Documentation gives complete and clear instructions on transferring to disk. I actually did the transfers and ran *TALKHEAD* and *Real Talker* from that copy; it was no problem. Everything performed as it had from the cassette version. For disk users, this software will not run on JDOS. I had to switch to Disk BASIC.

If you have Colorware's *Real Talker* and a 64K machine, don't deprive yourself of the exceptional graphics and realism of *TALKHEAD*. If you have the old version of *Real Talker*, you might consider updating, with its added features and increased ease of use. I have all four speech units for the CoCo and definitely feel *Real Talker* has become the simplest to use in a BASIC program — just `SAY ''Whatever''`. It's a fast, easy and convenient way to make your program talk!

If you're looking for a practical reason to buy *TALKHEAD* and *Real Talker*, my kids have all used the program and feel they would rather have Talkhead give them their spelling words and math problems than just having to look at a screen without the face! We're all in agreement in this household that *TALKHEAD* is a good addition to the voice and makes a great head for the *Real Talker* voice pak.

(Colorware, 78-03A Jamaica Ave., Woodhaven, NY 11421, 64K ECB, tape or disk $29.95; *Real Talker* 16K ROM pack and tape $59.95; $69.95 for CoCo 2 version)

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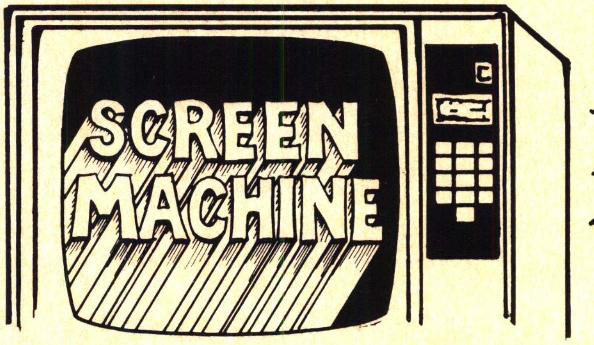

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Music Library 200 And 300 Make Beautiful Tunes

Question: Does the availability of new hardware generate software, or does the availability of software generate hardware sales?

Speech Systems is not taking a chance when it comes to supporting their music-generating programs for the Color Computer. They have released two additional sets of musical libraries to support their *Musica 2* system.

Recent reviews in THE RAINBOW have covered *Musica 2*, the music composing program, and *Music Library 100*, the first release of musical compositions which were generated using the Color Computer. The release of *Music Library 200 and 300* tremendously increases the amount of pre-recorded music which can be played on the CoCo, or modified if one has the *Musica 2* program.

First, I will briefly review *Musica 2* which was used to generate *Music Library 200 and 300*.

It allows you to create musical compositions with up to four-part harmony (four voices played at one time). The results are quite unlike anything you've ever heard using the `SOUND` and `PLAY` commands. The sound of the songs is quite electric, similar to the tones created by a Moog synthesizer, but also reminiscent of a harpsicord or a Wurlitzer band organ without the cymbals.

The Color Computer and *Musica 2* create the music by generating a stream of numbers that the CoCo converts to voltages through the sound port (six-bit digital-to-analog converter). By varying the numbers and then the voltages at the appropriate rate, a tone is produced through the TV speaker. Pitch is varied by skipping a certain number of values. This method of varying pitch makes it possible to produce more than one note at a time.

Musical notes are displayed on the standard treble and bass staffs as you create or edit them.

Music Library 200 and 300 does not contain the *Musica 2* program. You cannot create or edit music with these programs, only play the selections contained on them.

Music Library 200 contains:

Volume 11 — More music from the '40s, '50s, '60s and '70s (39 minutes, 21 selections)
Volume 12 — More music from the '70s (43 minutes, 21 selections)
Volume 13 — More music from the '60s and '70s (43 minutes, 21 selections)
Volume 14 — More music from the '40s, '50s, '60s and '70s (34 minutes, 21 selections)
Volume 15 — The Beatles (37 minutes, 21 selections) (my personal favorite)

Music Library 300 consists of:

Volume 16 — Variety (39 minutes, 21 selections)
Volume 17 — Nostalgia (42 minutes, 22 selections)
Volume 18 — Richard Rodgers Song Book (39 minutes, 19 selections)
Volume 19 — More music from the movies (40 minutes, 23 selections)
Volume 20 — Music from the '60s, '70s and '80s (42 minutes, 15 selections)

Each of these musical libraries is available on either disk or tape. The disk version is more desirable as it displays a menu of the available titles and allows you to play any selection at random, or program a series of your own selections — like a jukebox — except you don't need any quarters.

The quality of the compositions range from OK to fantastic. Clark Rulaford, who composed (or transferred) these songs using *Musica 2*, obviously took extra time on a few to maximize the results using the capabilities of *Musica 2*. "Lady Madonna" and "Penny Lane," from the Beatles disk, are outstanding examples of the capabilities of *Musica 2*, but "Norwegian Wood," also on the Beatles disk, drags.

To maximize the tonal quality of the songs, it will be necessary to add either an external speaker to your TV or purchase the Speech Systems Stereo Pak accessory which redirects the output through your stereo. The small TV speakers just don't have the tonal range to do justice to the capabilities of the *Musica 2* system.

A word of warning: If you purchase any of the *Music Library* programs, you had better start a fund to set aside enough to purchase the *Musica 2* program, because after you've heard what music can be created with your CoCo, you will want to start creating your own.

(Speech Systems, 38W255 Deerpath Road, Batavia, IL 60510, 32K disk $39.95 each, tape $34.95 each.)

— Bruce Rothermel

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RAM-16 comes with a complete Users Manual containing a circuit diagram and applications information.

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Screen+ Adds Variety To Your Text Screen

Screen+ is a machine language utility with several features. The color of the text screen as well as the characters on the screen may be changed to interesting, non-standard color combinations. The program does this while operating in a background mode with BASIC programs. The screen changes can be toggled from the keyboard or from within the program. Keyboard operation is achieved using the down-arrow key as a control key, while operation from within a program is best controlled by printing the appropriate `CHR$` as described in the instructions. Although the instructions say the keyboard commands can be used whenever `INKEY` or `INPUT` statements are active, I experienced erratic results when I tried this method. Better results are obtained when keyboard control is used before running the program.

The program also contains an auto-number routine for use in writing BASIC programs, a line list routine that will list a program to the screen line by line and an auto-repeat key function on all keys.

I found the screen commands to be of limited value. Each time any of the commands were called, the screen was cleared to the new command format. If a `CLS` is then used, the screen returns to the usual CoCo color. This makes it difficult to use this routine to enhance existing software as the screen usually ends up with some of each color present. This can make for some strange effects. When writing new programs, the screen effects available are more easily used and can give your software distinctive text presentation.

The other features of this program work well and make it easier to write your own programs. The auto-number routine can be set for any start number and any line increment. I find this feature helps my concentration when I am working on my latest "masterpiece" in code. The line list feature allows controlled scrolling through the listing to find just where that "lost" subroutine has gone. The key repeat feature is a mixed blessing; it's there whether you want it or not. I think it would be more helpful if this feature could be toggled on or off.

The instructions are supplied as a clearly printed two-page booklet photo-reduced to fit on one 8½ x 11-inch sheet. Loading instructions are explained and the necessary command lines for 16K and 32K computers are typed as they would appear on the screen. Instructions for use of the program features follows. The program is not copy protected, so backups are not a problem. The high quality cassette contains multiple copies, while the label contains the distributor's address and telephone number.

At the asking price of $16.95, I think this is a useful program for anyone who does not want to invest in a more complete BASIC helper program, and as a bonus you get some unusual text screens to make your work stand out from the crowd.

(Dataman International, 420 Ferguson Ave. N., Hamilton, Ontario, Canada L814Y9. 16K or 32K, any BASIC, cassette $16.95, disk $20.95, U.S.; cassette $19.95, disk $23.95, CND.)

— Charles Bream

One-Liner Contest Winner . . .

Crazy Quilt generates just that; a crazy quilt of colors on the screen. The program draws filled boxes on the screen at random. Normally these would be white, but by `POKE`ing a random value into 178, the boxes take on a certain texture and various colors.

The listing:

```
10 POKE65494,1:R=256:S=192:PMODE
4,1:PCLS:SCREEN1,1:A=RND(-TIMER)
:FOR N=0TO200:A=RND(R)-1:POKE178
,A:X=RND(R)-1:XT=RND(R)-1:Y=RND(
S)-1:YT=RND(S)-1:LINE(X,Y)-(XT,Y
T),PSET,BF:IK$=INKEY$:IF IK$="E"
 THEN POKE 65494,1:END ELSE NEXT
 N:GOTO 10 ' Crazy Quilt
```

Lee Veal
Rowlett, TX

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

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Arithmetic Tutor Is A Good Practice Tool For Problem-Solving

Sometimes I view computer programs somewhat analogous to television programs. A great many of them (mostly games) are for entertainment only. These are the sitcoms, variety shows and soap operas of computerland. Applications (word processing, etc.) are similar to TV news programs. Finally, educational programs for computers can be compared to educational programs on television: some are great and some are very boring.

With this in mind, I looked at an educational offering from Computer Island called *Arithmetic Tutor*. This package is primarily made for a classroom environment and allows practice in multiplication, long division, factor operations and the hierarchy of operations. Significantly, the program provides feedback not only in a "number right" report, but also provides a diagnostic listing on various aspects of the operations needed to complete a problem. The teacher (or parent) can then help the child overcome his specific computation problems by checking out what problems continue to crop up on the report.

From a programming standpoint, *Arithmetic Tutor* is thoughtfully made. The student is lead step-by-step through the problem-solving process, and is prompted at every operation to tell what the next computation will be. I do have a criticism with *Arithmetic Tutor* in this area as the program seems to be more interested in computational skills than in process. That is, the program leads the student through the process basically asking, for example, "OK, now it is time to multiply; what is 8 times 7?" instead of "do I multiply or carry a number next?"

On the positive side, as with most good educational programs made for computers, the BREAK and CLEAR keys are disabled to prevent students from destroying records of other students' work that hasn't been saved to disk. *Arithmetic Tutor* also features a Help command to give the students aid if they run into a problem area. The program will automatically "help" students if they press ENTER without giving an answer. All this is recorded in the report area so the teacher can check what areas the student needs the most help in later.

Although each session will hold information on a class of only 15 to 17, the program will extend to hold more students if disk space is available. A password must be provided to reveal diagnostic information as well as to start a new session. One potential problem is no provision is made if students have the same name. One student may wipe out another's file if both are named "Ted," for example. The documentation suggests using a different name for one of the "Teds." My experience with children is that they are very proud of their names and they don't care to change it for anyone (including a computer)!

The most important test of any educational program is how well it works with its intended student. Here, I must get back to the television analogy. The best educational programs hold the student's attention while they continue to involve the viewer in some educational process. Here is where *Arithmetic Tutor* has a major problem. After the initial interest in the program because of the computer gimmick, I found children quickly discover the program is mostly drill and practice with little reward and they lose interest. My daughter also complained that it was too hard to do the computations on the keyboard and video screen, and she soon resorted to paper, wondering why she was doing such problems on a computer, anyway. The answer, of course, is the diagnostic areas provided for the teacher. The teachers, when using this program, will have to be ready with some answers to these questions if they attempt to use the program in class.

A few questions are not answered in the documentation provided with the program. The author does not attempt to affiliate a grade level with the program. I suppose this is not important as far as the arithmetic portion (a teacher can use it when needed), but it *is* important for giving a teacher a clue as to the level of the written material (such as instructions to the student). The program is not protected, but there is no indication whether the teacher may make multiple copies if there is more than one computer in the classroom.

Educational software is so sorely needed for the Color Computer it is really hard to be critical when one is produced. I would much prefer my daughter to be using *Arithmetic Tutor* on the computer than playing another round of some Pac Man-type game. I fear, however, that as students have gotten bored with the "talking head" approach to television and television moved to much better programs, so it is with "practice" programs such as *Arithmetic Tutor*. Buy it as an alternative to games for your students or kids, but let's hope for a little more pizzazz in education programs for the future.

(Computer Island, 227 Hampton Green, Staten Island, NY 10312, 32K disk $49.95)

— Brian James

One-Liner Contest Winner . . .

You might call this one-liner a "one-worder." It asks you for a single word, a delay value and a screen location, then flashes the word you gave at the desired location, alternating between normal and inverse text.

The listing:

```
0 INPUT"INPUT POSITION, DELAY, W
ORD";P,D,W$:CLS:L=LEN(W$):FORX=1
TOL:L$=MID$(W$,X,1):N$=CHR$(ASC(
L$)+32):F$=F$+N$:NEXT:FORX=1TO20
:PRINT@P,W$;:FORY=1TOD:NEXT:PRIN
T@P,F$;:FORY=1TOD:NEXTY,X:CLS:RU
N
```

Kelly Weston
Kansas City, MO

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

Software Review

Color Stat Strategy Baseball Is An Excellent Statistical Game

Color Stat Strategy Baseball is produced by Pinto Products. The program is on disk and requires a 32 Disk Extended BASIC system. The disk includes three programs which are listed as: *CS*, *DF* and *LD*.

CS is the actual baseball program. When you run it, you will be prompted to input the visiting team, then the home team. After each team is selected, the program automatically loads their statistics from the disk. Next, you will be required to select your batting order, then your pitchers. Now on with the show!

The screen will clear and the batting orders are shown as follows: 1-9 visitors, A-I home, then you input which batter is up and he will appear on the screen along with his statistics.

You have eight options from which to choose. 1) hit; 2) change; 3) sacrifice; 4) hit and run; 5) intentional walk; 6) steal; 7) squeeze play; and 8) infield, in/hold runner. The computer will check the batter stats against the pitcher stats and the results will be shown on the screen. The computer takes care of the plays and the outs. The Simulation continues for the rest of the game.

DF is a data file program which is used to create new teams and their statistics, which could be past, present or ones you make up.

To establish a new data file, first you input the team name, then choose (b)atter or (p)itcher, change or input. You are then prompted with (Name AB, H, 2B, 3B, HR, SO, SR, RR), for example: Morgan 404, 93, 20, 1, 16, 54, 89, C, 16 then ENTER.

For pitchers, you are prompted for the following: IP, H, SO, BB, ER, HR, Won, Loss. After each player change or addition, you will be prompted (another pitcher Y/N), (another batter Y/N). If no, then the screen will clear and you will be asked to make a selection as follows: R-restart, N-restart and create new file, Q-quit, L-to run list data program.

LD is a list data program for reviewing or changing an existing data file, or printing out teams and stats.

Color Stat Strategy Baseball is a well-written program with very good documentation, but as a baseball buff, I see this more as an excellent statistical program than as a baseball game. It seems to be hard for an amateur baseballer to follow because: 1) no scoreboard; 2) the program does not tell who is on base; 3) if the inning changes, the same team can bat and 4) all scores and base runners are to be kept on a separate sheet. I feel if these points are corrected and inserted, this would be a more enthralling baseball game.

(Pinto Products, 718 Fiji Circle, Santa Ana, CA 92704, disk $27.95 plus $2.50 S/H)

— By Terry Brown

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B-XREF Is A Good Utility For Any BASIC09 Programmer

Anyone who does much programming knows about cross-reference programs. They are utilities that take programs and create such niceties as a variable dictionary consisting of the location and type of variables, listings of those lines pointed to by other lines by `GOTO`s and `GOSUB`s, and other useful references. These programs are hard to come by, however, since they are complicated to write and demanded only by the more experienced of programmers.

Since BASIC09 is relatively new, many companies have not put much time or money into the development of such "risky" programs. Fortunately, for those of us who program in BASIC09, one company has. It is Interactive Micro Systems and their program is called *B-XREF.* This is an excellent program that can be used by anyone, from first-time users to old hands at programming.

The operation of the program is extremely simple; simple enough, in fact, to warrant a one-page instruction sheet. On the fact-filled page there is a program description, installation procedure, general instructions, restrictions and a list of error messages.

Installation refers to placing the program where it can be used. This is simply to copy the program from the master disk onto your working disk. Nothing can be simpler than that. To invoke the program is only a few keystrokes more difficult than the installation. The command line that makes *B-XREF* go to work is: `bxref [-f] [-w] [-l] in-file1 [in-file2 . . .] [>outfile]` with the items in the square brackets being optional.

All of the options preceded with a dash are called switches. These allow for a customized output with as little extra work by the user as possible. The switches are as follows:

-f allows form feeds to be suppressed for use with printers which do not accept form feeds.
-w creates a narrow report, as opposed to a wide one, which is especially useful for on-screen outputs.
-l will prevent the listing of the source procedure; otherwise the procedure is printed out before the cross-referencing information.

Another feature of *B-XREF* is that more than one procedure can be cross-referenced at a time; simply add the procedure name to the command line. In addition to multiple procedure names, the command line may have any valid output path. This allows for the output of the cross-reference to go to a file on disk, to the screen or to the printer.

B-XREF has only two obvious limitations, as is stated in the documentation: The utility should be used only on unpacked, error-free procedures. If, however, it is fed a procedure with a misspelled keyword, for example, there is a good chance *B-XREF* will help you find the mistake. The second restriction is there may be no more than 500 total references. This includes the use of a variable name, procedure name or line number. There is a note that if the latter restriction is a problem, simply contact Interactive Micro Systems for help.

Any utility would not be complete without error messages. These are few in number (four) and cover problems in opening files, lack of available memory, or a full reference table. The messages are self-explanatory, but the documentation goes even further in explaining their meanings.

The output of the utility is clearly laid out. At the top of the page is the source listing of your procedure, unless prohibited by the -l switch. After that, the program starts listing all variables and procedure calls in alphabetical order. On the left-hand side of a line is the name of the variable, and on the right side is the type of variable: integer, string[20], procedure name, etc. On the next line appears the line in which the reference occurs. The source program lines need not be numbered, as in Disk BASIC, so when *B-XREF* lists the source code it includes line numbers of its own.

In general, I think *B-XREF* is a well-done utility which will be useful to any programmer who uses BASIC09. Perhaps it would be helpful to have the program cross line numbers as well as variables, but since BASIC09 does not require them, this is a trivial omission. If only there were more utilities such as this for other languages for the CoCo!

(Interactive Micro Systems, P.O. Box 21007, Columbus, OH 43221, disk $19.95, plus $2 S/H)

— Jim Sewell

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```
4849 3838 5752 4692 1117 2282 4098
4931 9521 3342 1111 5555 6798 7872
9284 4848 5957 1918 8888 2480 9227
4674 9992 6792 7531 7788 5568 1357
2628 9693 1617 5957 5973 2872 2735
3737 7969 1617 7098 2222 1918 5845
4636 8958 6152 6834 6936 2725 7956
6363 1986 5332 3627 5937 8753 2272
7857 2563 9472 4444 9842 6677 2358
2345 3457 6643 7888 2889 7887 1345
4456 9542 5689 3232 6788 1146 8765
5677 6785 8990 2257 8754 7378 8448
5578 2357 4456 9853 6653 2356 1245
2356 4678 3345 8993 8444 6663 5587
7754 9293 7788 4334 8732 4577 6886
6785 8377 7565 7879 5456 5567 4492
2356 2568 8432 7742 8098 2464 6779
3224 7678 3454 9554 3458 9878 6587
5465 6444 8778 3434 8787 6777 5656
4667 4555 6655 5545 3583 6783 7999
7888 4445 4568 3356 8900 2225 9020
3723 5777 2345 8743 8644 8765 2346
5454 7867 4446 8654 3456 3467 8454
4565 6568 4347 8645 8753 4346 3245
4434 5656 2389 6587 6787 6578 3489
5787 6767 9954 7788 4456 8894 8054
3456 7774 6784 7884 8554 4566 3345
3565 5676 4564 6658 8554 6775 4554
4555 5787 8544 7678 4379 8754 8773
3467 5789 7656 3468 4579 8884 6746
```

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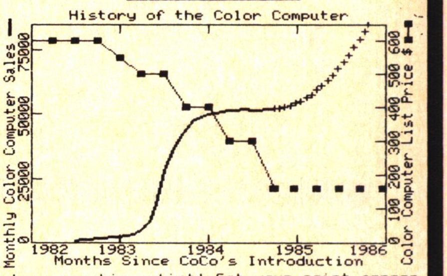

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Shiver Your Timbers With *The Sailor Man*

The 64K arcade games have finally arrived for the Color Computer and if the development of *The Sailor Man* by Tom Mix Software is any indication of things to come, our patience will have been well rewarded.

As the title suggests, the hero of this four-screen, action-packed thriller bears a strong resemblance to the knobby-kneed, swollen-wristed Popeye, whose zany exploits have long fascinated generations of Americans who love to pull for the good guys in white hats.

And true to form for Tom Mix, the CoCo version of this popular arcade game includes all of the features that have made it a hit, plus a few extras.

Loading is highlighted by a high resolution version of the Tom Mix logo, which is followed by a message asking the user to be a part of the software pirating solution by not making unauthorized copies of the program for friends. When the disk stops whirring, you are required to type in a common password supplied to all purchasers of the program. The procedure is a little confusing at first, but with a little practice, it comes easy.

After high scores from previous games are loaded (in the disk version), there's a color test to ensure that you are treated to the dazzling display of colors that are to follow.

On the first screen you dash madly about on four floors of play, negotiating eight different stairways while attempting to catch enough of Elsie's kisses (red hearts that float from the top of the screen) to fill in the 20 squares on the Sailor Man's house. As on all of the screens, you are vigorously pursued by none other than Bigfatbadguy who has his own ideas about who ought to be getting Elsie's favors. You're in danger of being eliminated until you can swallow a can of spinach, which will give you incredible power over your enemy. There's a punching bag at the top of the screen which, if your timing is exquisite, can send a bucket down onto Bigfatbadguy's head — a feat that will bring smiles to any onlookers.

The principle is the same on the second screen except that you are expected to catch musical notes. Oh, yes, there is the Olduglyseawoman who appears at higher difficulty levels to hurl empty bottles at you. You must punch them to avoid being bounced into the water. The objective is to catch enough notes to play Elsie a love song, which advances you to the third screen where you must collect enough letters (thrown by Elsie's cries for H-E-L-P) to build a ladder to the crow's nest where Elsie is trapped.

One of the real delights of the game is watching Bigfatbadguy sail through the air, bouncing off the left and right sides of the screen and then hearing the highly audible splash when he hits the water.

Adding interest are the various musical interludes between screens. You'll recognize and appreciate a fast-moving version of the Popeye theme song. However, if you tire of the music, press the 'M' key to toggle the music on and off.

By pressing the CLEAR key, you may select the number of players, the level of difficulty (from 1 to 9), the number of attempts, and the screen on which you wish to begin. Starting with any more men than three will prevent you from entering your name on the high-score table.

After a while you forget the novelty of playing a 64K game because the difference really isn't that noticeable, which actually says a lot about the quality of the games already on the market for the Color Computer. However, any feature you ever wanted in an arcade game is included in *The Sailor Man.*

(Tom Mix Software, 4285 Bradford N.E., Grand Rapids, MI 49505, tape $29.95, disk $34.95.)

— Charles Springer

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Preschool Pak Reinforces Letter And Number Recognition

Preschool Pak is a pair of programs designed for (who else?) preschoolers. *Alphatalk* promotes upper- and lowercase letter recognition. *Countem* drills in counting and number recognition. These programs are designed to utilize the *Voice Pak* by Spectrum Projects, but don't feel left out if you don't own one. *Alphatalk* and *Countem* work well without the voice.

In the program *Alphatalk*, the child matches letters on the screen with keys on the computer. When run, *Alphatalk* graphically displays on the screen a letter of the alphabet. It randomly chooses an upper- or lowercase letter. If you have the *Voice Pak*, the program will say the letter and wait for a response. If, after five seconds, no key has been pressed, the letter will be spoken again. If the wrong key is pressed, the letter will be spoken again and the program waits for the correct key. When the right key is pressed, a clown face appears, a snappy tune plays and the voice tells them they are correct. The next letter then appears.

The colors and graphics are nice in this program; even those kids who were old enough to know their alphabet forwards and backwards had fun with *Alphatalk*. My one criticism, though, is with the graphics. *Alphatalk* is all done in low resolution graphics. This makes the letters hard to read sometimes, particularly for those children who are not very familiar with lowercase letters.

Countem is a Hi-Res graphics program. When run, up to 10 interesting objects appear on the screen. They may be cars, birds, lamps, TVs or robots. The child counts the number of objects and presses the appropriate key. As in *Alphatalk, Countem* does not punish a wrong answer with noises or flashing displays, but simply waits for the correct response. When the right key is pressed, the screen changes to a pair of robot-like creatures who shoot a laser back and forth. There is a musical tune and a spoken reward. The next group of objects then appears on the screen. This program reinforces number recognition as well as counting skills.

Both of these programs are simple enough for preschoolers to play and enjoy without much adult intervention. Children as young as 3 and as old as 6 had fun with *Countem*. *Alphatalk* was enjoyed by all who were ready to learn both upper- and lowercase letters.

(Harmonycs, Inc., 1747 Patricia Lane, Salt Lake City, UT 84116, 16K cassette or 32K disk ECB $15.95 plus $2 S/H)

— James Ventling

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Grand Prix Rivals Arcade Version Of Auto Race Games

You expect the unexpected when you strap yourself into the Formula I in Intracolor's *Grand Prix*, but there's no way you could ever prepare for the hairpin turns.

You're zooming along, knowing the turns are ahead, but suddenly the track becomes a maze of stripes and your senses fail you. Your only option is to hit the brakes, let up on the throttle and hope for the best!

Among the recent auto race arcade games introduced for CoCo, *Grand Prix* is one of the more challenging. The graphics are excellent, although not comparable to MichTron's *Speed Racer*, in which the background competes strongly for your attention.

The dashboard is well designed, with gauges displaying the best time, the track number, lap number, miles per hour, gear and elapsed time. The steady hum of the Formula I adds a lot of realism to the program. You have the feeling that you're in for some serious competition.

When you're ready to begin, press the CLEAR key to select the desired track (there are five from which to choose). You may choose from either the keyboard or the joystick mode. If using joystick, just use the firebutton to shift gears. To accelerate, move the stick forward; to brake, pull the stick back. In the keyboard mode, the SHIFT key is used to shift gears. The up- and down-arrow keys are for acceleration and braking, the left- and right-arrow keys for steering.

The object is to score the lowest elapsed time for five laps in any one of the five different tracks. If you crash three times on one track, the game is over. When five laps are completed (a lot of practice runs will be required), your time is compared with the previous best time and you advance to the next track.

Grand Prix is another of those programs rivaling the quality of those many of us have longed for after visiting the neighborhood video arcade. It just goes to show that CoCo is capable of just about anything!

(Intracolor, P. O. Box 1035, East Lansing, MI 48823, tape $34.95, disk $34.95.)

— Charles Springer

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LIZPAC: An Extensive Statistical Analysis Package

By Frank J. Esser

A variety of statistical packages have existed for mainframe computers for quite some time. They are an invaluable aid to scientists and engineers, and give these people the ability to put observed data into some meaningful form and, quite often, display the results in graphical form. These packages offer a number of different routines or programs, and depending upon what the individual desires, dictate which of the routines he would use. Sometimes more than one routine will be found useful, and at other times, the data output from one may be fed into another to produce still another set of data. Whatever the desire of the user, the bottom line is that he has at his disposal a set of routines to help analyze data sets and reach a conclusion without the need for long and lengthy manual calculations. To anyone who has gone through such manual calculations, you know what a problem it can be.

What has all this got to do with *LIZPAC* and the Color Computer? Well, a statistical analysis package has come to the world of the Color Computer. Those of you interested in frequency distribution, regression analysis and so on, this is what *LIZPAC* is all about. I am not a whiz at statistics and cannot begin to determine if everything is present that would be desired. However, I can attest there is an awful lot offered by this package that should more than delight the heart of the user.

The programs come on eight 5¼-inch diskettes — that is correct — there are eight diskettes full of programs and editors. The documentation is contained in a standard three-ring binder and consists of around 140 pages of instructions, and approximately 35 pages of printer listings of individual program runs. The last section contains the instructions for SHOWPACK 1.0 which will help create, label and edit Hi-Res graphics screen displays.

LIZPAC consists of 88 statistical and file management programs. *LIZPAC* programs are loaded by a single keystroke from the control program. Minimum requirements for *LIZPAC* are 32K of memory, Extended BASIC, a printer and at least a single disk drive. According to the documentation, *LIZPAC* can be used by individuals who have only a superficial knowledge of the use of computers. The excellent use of menus and screen prompts are enough so the user need not worry about data files, etc. Many of the programs ask if data files are to be constructed during the running of this program. The user is then prompted how to enter the data.

The documentation also states *LIZPAC* does not assume the user has an extensive knowledge of statistics. However, the user must be sufficiently familiar with the statistical process and terminology as to be able to provide appropriate responses to *LIZPAC* queries and prompts; if you don't know anything about statistics, this package is not for you. *LIZPAC* is written entirely in BASIC, and can be listed and modified should the user feel the urge to do so.

LIZPAC is broken down into five packages. The following is a brief description of each of those packages.

Package A — Core Package

Data File Administration — Has a complete editor for editing data files, utilities to perform sorting, merging, deleting from and adding to data files.

Descriptive Statistics — Consists of one-way frequency distribution, random sampling, theoretical frequency distribution, histogram and frequency polygon.

Comparison of Means — Comparison by t-test, Scheffe's test and Tukey's test; examination of means for polynomial trends; partitioned ANOVA tables and standard ANOVA tables.

Regression Analysis — Mass production of Pearson's "r's." Special packages for polynomial regression and exponential regression analysis.

Transformation of Variables — Performs variable transformation by incorporating user-written BASIC statements.

Showpack — Disk graphics package for editing and labeling *LIZPAC* graphs saved to diskette.

Datapack — Converts ASCII files to *LIZPAC* files or converts *LIZPAC* files to ASCII files.

Package B — Factor Analysis

Programs in this package provide for preparation of the raw data file and the correlation matrix, extraction of the principal components and estimating the principal factors by iteration. The rotation methods available are Quartimax, Varimax, Orthomax and the Direct Oblimin method.

Package C — Discriminant Analysis and Canonical Correlation

Performs a complete discriminant analysis and canonical correlation analysis, Geisser classification, and includes a program for one-way analysis of covariance with multiple covariants and multiple variables.

Package D — Cross-tabulation and Related Programs

Analysis of Cross Classifications — Program will perform a two-way analysis or will print a multidimensional table as a series of two-way tables.

Non-Parametric Statistics — Includes such tests and procedures as: Wilcoxen signed rank test; Hodges Lehmann estimate of the median; the Friedman two-layout and many more.

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Package E — Time Series Analysis and Forecasting

Includes such forecasting techniques as ANOVA for trend and seasonal effects, plus much more.

Also included with *LIZPAC* are three utility programs which make using the analysis programs all that much easier. The utilities are EDITOR, DATAPACK and SHOWPACK. The editor will allow you to edit any of the data files created by the various programs. It is run from the main entry menu from which all the *LIZPAC* programs are run. When the editor is first started, it comes up in the ready state. Pressing the 'B' key will enable all the function keys used by this processor. All the commands are executed under the EDITOR via single keystrokes. The following is a list of the commands available and the control keys.

SHOWPACK is a program which will help create, label and edit Hi-Res graphics displays. Aids are provided for plotting data from tables, drawing with the joysticks, and creating pie charts and bar graphs. Graphs can be plotted using data tables stored on disk. It is loaded and run in the standard manner.

The *LIZPAC* package is quite impressive. The authors have gone through quite a bit of work to ensure the programs run as they should and have added some very nice utilities. The EDITOR is not a *Telewriter-64*, but is functional and does the job very nicely. SHOWPACK is another good example of the type of utilities that were added; it will let you plot your data on the screen in the Hi-Res mode. You can then label the charts, graphs, etc., however you want. The entire screen display can be saved and, if so desired, can become a part of a slide presentation. The programs themselves are quite concise, and from the very simple tests I ran, straightforward to use. Every attempt has been made by the authors to make the programs usable by someone other than a computer expert. One nice feature of each data run is the ability to add to the output listing, the date of the run and the person performing the run. That appears on each printed output even if it goes to the disk.

I am not a statistician nor do I perform the type of data analysis in my everyday job that these programs provide, but I do know that *LIZPAC* is not for everyone. For those who need to perform data analysis of any kind, be it social studies, agricultural studies, scientific studies or any type of data manipulation, I think this is the set of programs for you. The only hard part is getting the data on the disk for processing. A utility called DATAPACK will take a *LIZPAC* file and convert it to an ASCII file or an ASCII file to a *LIZPAC* file. So if you have a terminal program and your data is on some other machine, you can dial into that machine, access the file, and *LIZPAC* will do the rest.

I like *LIZPAC*. It is well-done and the documentation, though not for the beginner, is also well-done. There are eight disks full of programs and sample data files. Again, this package is not for someone who does not have at least a good general background in statistics or data manipulating. It assumes a knowledge of certain skills is already present.

(Prickley-Pear Software, 86 Cherokee Shores, Northport, AL 35476, $200 plus $5 S/H)

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Be A Battleship Mate In *Talking Shiphunt*

If you're looking for a version of "Electronic Battleship" for the CoCo, your search is over. *Talking Shiphunt* is a strategic game requiring 32K Extended BASIC, one joystick and one player. For the best effect, Spectrum Project's *Voice Pak* with Del Software's *Translate* program should be used in conjunction with the program. *Shiphunt* can be played without voice, but it's much more interesting when CoCo talks to you.

A short instruction sheet is included which tells you how to load in the programs. *Shiphunt* is supplied on cassette, but can be easily saved to disk or another tape for a spare copy. Before loading, make sure the CoCo is off, then insert the *Voice Pak* cartridge. Next, `CLOAD''SHIPHUNT''` and run it. You are then asked "Do you want me to talk?" If yes, put the *Translate* program into the cassette player and press 'Y' to load and execute. (*Translate* is the machine language text-to-speech program.) Before the game begins, instructions can be read and/or heard.

Game play is similar to the pegboard game "Battle-Ship." One big difference between the two is that the player does all the guessing in *Shiphunt* as to where the computer hides the ships. The player doesn't have ships of his own to deploy for CoCo to find. My attention span would have been longer if this capability was included.

At the start, a 9 x 12-inch Hi-Res graphics grid is drawn on the left of your screen with 71 shots available. I prefer to use the keyboard to place the cursor in the spot I wish to fire upon. However, response time between the keystroke until the cursor moves from block to block is slow and can be aggravating. The right joystick must be plugged in so the cursor doesn't drift across the screen. It can also be used for movement, but the keyboard provides better control.

The object is to sink all five of the computer's ships before your shots are gone. Five hits are needed to sink the battleship, four for the cruiser, three for the submarine, two for the destroyer, and one for the frigate. If you miss, a green bar appears in the block you last shot. Hits are displayed as yellow bars. Indicators at the right of the screen list how many ships, and which ones, have been hit or sunk, and how many shots are left.

Throughout the game, you can hear the captain giving orders to his crew: "You scrub the deck," "Load the cannon," and "Get ready to fire," are a few. The captain will also talk to you, saying things like "Please, can't we talk this over?" Sometimes it's hard to understand what is spoken, but if you turn the volume up and listen closely, the sentences make sense. Anytime during the game, hitting 'T' will turn the speech off. This will speed up execution of the program, but it's not as entertaining without speech.

There is no big finale at the end. When someone wins, a text display of the grid is flashed on the screen for a few seconds, which shows where the remaining ships (if any) are and what your score is.

Talking Shiphunt is a good game for the younger children and inexperienced game players who don't want a lot of action. If you plan to purchase it, make sure you first have the *Voice Pak* with Del Software's *Translate* program.

(JARB Software, 1636 D Avenue, Suite C, National City, CA 92050, cassette $10.95)

— Darren Nye

One-Liner Contest Winner . . .

This program draws a tight spiral, paints in the gaps, changes screen modes and does it again. It's great for seeing how the `PAINT` command works.

The listing:

```
10 B=0:A=1:PMODE4,1:PCLS:FORR=1T
O2:SCREEN1,B:FORI=1TO91STEP4:CIR
CLE(128,96),I,A:NEXT:COLORB:LINE
(35,96)-(221,96),PSET:CIRCLE(128
,96),93,A:PAINT(128,99),A,A:A=0:
B=1:NEXTR:RUN
```

Kevin Oberberger
Sparks, NV

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

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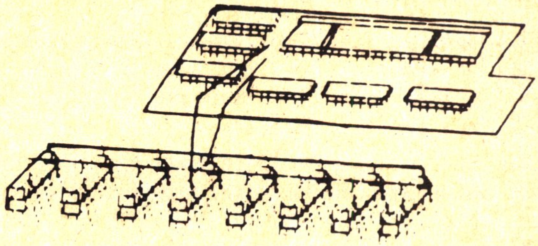

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Gamble Casino-Style With *Bakersfield KENO*

Anyone who has ever visited one of our gambling meccas has probably played keno. You can't help not playing it because it's everywhere; in the restaurants, lounges, the casino game areas, even in washrooms.

My favorite casino has a great $3 steak and eggs breakfast in its dining hall. In the middle of the tables with the salt and pepper shakers are keno trays filled with forms and pencils. The roving game steward is only too happy to pick up your game ticket and bet at your table. That $3 breakfast usually winds up costing a lot more after losing a number of keno games.

Bakersfield KENO comes on cassette and requires 32K Extended BASIC and is not copy-protected. After you run the program, your eyes are treated to a Hi-Res graphics display of numbered Ping-Pong balls bouncing around a glass jar, just like in the casinos. An attractive keno board fills the screen that serves as both the game ticket and the game board.

The program prompts you for the starting bankroll that cannot exceed $1,000. The maximum bet allowable is $9,999 or less, depending on how much you have left. The program keeps track of your bankroll, bets and payoffs.

Next, you pick how many numbers will be played with a choice of from one to 15. You can use the left-arrow key to go back and change a number before starting the actual game — a nice feature. The computer then selects 15 numbers at random and more times than not, they are not the numbers you picked (just like in the casinos)! I played over 100 games and only won once, which made me wonder if the game is rigged. This theory was quickly blown to shreds, however, when a friend of mine who does very well in casino keno won a lot more than I did using this program

When you run out of money or come very close to winning, any one of a number of humorous phrases is displayed, such as "CLOSE BUT NO CIGAR."

Bakersfield KENO can be considered to be both a home version of the game and a serious simulation of the real thing, except for one detail. Only one game card can be played per game. I would have liked to have been able to play several cards at once or play along with friends.

I could find no bugs in the program, and great care has been taken to reject incorrect user response.

The documentation consists of one typewritten page that is mainly a payoff chart with simple instructions to run the program. Even if you have never played keno before, the documentation is sufficient to get you going and understand all the features and options.

Bakersfield KENO is fun to play and is sure to please those who can't afford to drive to Reno every time the keno bug bites. Even though I kept on losing my bets, it was hard to stop playing (just like in the casinos)! Nothing else is required to use this fine program except the feeling that "Lady Luck" might be on your side today.

(Seibyte Software, P.O. Box 6464, Bakersfield, CA 93386, tape $22.84)

— J. Michael Nowicki

BASIC COMPILER

MLBASIC 1.0 - BASIC COMPILER

WASATCHWARE is pleased to introduce what we feel is the most comprehensive BASIC Compiler available for the Color Computer. This BASIC compiler, called MLBASIC, is for programmers who want to create machine language from BASIC programs. Written in machine language, MLBASIC will prove to be the most powerful utility on your shelf.

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CALL END EXEC FOR STEP NEXT
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ON..GO RETURN STOP SUBROUTINE

3. Math Functions
ABS ASC ATN COS CNV EOF
EXP FIX INSTR INT LEN LOG
LOC LOF PEEK POINT PPOINT RND
SGN SIN SQR TAN TIMER VAL

4. String Functions
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STR$ STRING$

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DST IBSHFT LREG PCOPY PMODD PTV
REAL SREG SWP VECTD VECTI

WASATCHWARE believes that the 6809 based microcomputer is powerful enough to warrant such a compiler. MLBASIC is a BASIC compiler that allows structured programs (using SUBROUTINEs), full floating point arithmetic and other features not available with Interpreter Basic programs.

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One-Liner Contest Winner . . .

If you write machine language programs and have a printer, try this one-liner. It generates a chart on the printer of text screen memory locations in hexadecimal. (If you plan to make a batch of these charts in order to mark them up, you might consider doing it on a copier to save wear and tear on the printer.)

The listing:

```
1 CLS:PRINT" HEX SCREEN LOCATION
S":PRINT" READY PRINTER (PRESS E
NTER)":INPUT" READY";K$:CLS:PRIN
T"WORKING....":PRINT#-2,CHR$(27)
;CHR$(20):C=0:FORX=1024TO1535:C=
C+1:PRINT#-2," ";HEX$(X);:IFC=32
THENPRINT#-2:PRINT#-2:C=0:NEXTEL
SENEXT
```

Fred Furtado
Springfield, VA

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape.*)

TEXT Teaches Valuable Lesson In Word Processing

What could possibly be interesting about a program called *TEXT*? Is it something you read with or write with? It must be boring with a name like that.

That's what I thought. I was wrong! You're not going to be razzled and dazzled with lights and colors, but your child will receive a valuable lesson in a pre-word processing activity.

TEXT allows children to type, edit and format words and sentences on the video display. The letters are large and appropriately sized for young children. Each line holds 13 characters and each screen, seven lines. The program can hold up to three screens of information in memory. The cursor has four-way non-destructive control; text is not destroyed when the cursor is moved. Paging is controlled by placing the cursor in the bottom or top corner and pressing the right- or left-arrow key. When paging to the next screen, a brief waiting period is encountered while paging takes place. This wait would be inconsequential for small children.

What would a word processing program be without some filing and retrieving capabilities? *TEXT* has these, also. Pressing the SHIFT and left-arrow keys at the same time invokes the utility menu. From this menu, saving and retrieving from disk or tape is possible. Printing the file is also an option on the utility menu. All printable keyboard characters are programmed into the *TEXT* program.

TEXT would be a valuable tool for schools and parents who desire an introduction to word processing for children. All the terms and conditions of a sophisticated word processing program can be introduced and demonstrated. Used properly, a child would benefit greatly from this program.

There are a few problems with the program that need to be addressed. The following enhancement suggestions would add to an already fine program. The program is written in BASIC and the BREAK key is not disabled. This is an absolute must for programs that are to be used by small children. No recovery procedures are built into the program. Another feature that would be nice is auto key repeat. This would provide an even more realistic word processing experience. One last enhancement would be improved documentation. If a program is to be used with young children, ideas and projects should be offered for the parent or teacher. *TEXT* documentation is one copied sheet with instructions.

In summary, *TEXT* is well-constructed and bug-free. It's a lesson for learning that should not be missed!

(Wish Software, P.O. Box 7366, Johnston, RI 02919, $24.95)

— Rick Cobello

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DATALIST Is A Good General Purpose Database

DATALIST is a database program written by Arlin Karger and distributed by Computer Associates, Inc. It is a cassette database written for the 32K ECB Color Computer that suits its purpose well. Among the things a computer does extremely well, given the proper software tools, is file, sort and format data. *DATALIST* does all this and more.

Among the database types is the File-Management System, which lets you create, save and retrieve records made up of fields into a file. Mailing lists are usually a specialized version of this type of database, and *DATALIST* is a general purpose database of this kind. The chief limitation of this type database is that you cannot merge information in one file with information in another file. You have to know what to put in the file, and prepare for it from the beginning. The File-Management System works very well for most purposes, and especially well with cassette-based systems.

DATALIST is clean and well-prepared. My one complaint is that the load procedure is a bit cumbersome. You must `CLOAD ENTER`, `RUN ENTER` and `RUN ENTER`. Looking at the code, I felt one of the `RUN ENTER` steps could have been eliminated, but considering all else, that's being picky.

There are three copies of *DATALIST* on the cassette, all of excellent quality. Each loaded cleanly on the first and subsequent passes. The manual is a clear and concise six pages, along with seven pages of descriptive tutorial. The tutorial takes the user through the creation of an address file — an expected and practical application.

Although the program is sold as being for a 32K ECB CoCo, I deliberately created a large file of 400 records, with 500 characters per record without problem in a 64K CoCo. It should be noted if you do manage to bomb the program, entering `GOTO 1` will get you back in business with your data intact.

The function selections, all menu driven, are as follows:

A) Add record — permits the input of data, following prompts, within the specified fields.

B) Delete record — permits complete deletion of a record.

C) Edit record — may be used to "Edit" any record.

D) Sort — permits the alphabetical sorting of any column within the file.

E) Load file — loads previously created files for printing, editing, search, etc.

F) Save file — saves all records for future use, including all field data.

G) List a record — list by selection, scroll up or down including wrap-around.

H) Print reports — this takes a little practice, but if it is in your file you can print it — alone or the whole thing.

I) Print labels — obviously for use with mailing lists, but not so limited for the creative mind.

J) Select printer — I like this feature a lot. Unless you "select" (turn on) your printer, data goes to the screen. The program is configured for the Epson MX/RX or Gemini-10. Option '0' will select the printer with no specialized commands for the Gemini or Epson.

K) Set fields — this is where all records begin. You can use this option only if 'E' or 'K' have not been previously used.

L) Analyze a record — this scrolls a record by fields. It is great for determining the location of a particular field within a record.

M) End — ends the program.

If you have a cassette-based Color Computer, and can profit from the use of a good general purpose database (or just want to find out what databases are all about), I recommend *DATALIST*.

(Computer Associates, Inc., P.O. Box 683, West Fargo, ND 58078, cassette $24.95)

— Gary Smith

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BBS Log Book Can Help You Get Organized

With the ever increasing popularity of long distance Bulletin Board Systems (BBSs), it becomes more and more difficult to keep track of which systems are available and what is required to access each of them. The BBS Log Book is designed to help solve many of these problems.

The book, which is 75 pages long, has a cardboard cover and is bound with plastic binding. Four pages of instructions are provided, even though the book is fairly self-explanatory. It contains three sections designed to cover most telecommunications needs.

The first section, called the "BBS Log," contains 50 pages of charts with headings for the BBS name, telephone number, optimum Baud rate, password, date, time on/off, messages received, uploads/downloads and special notes.

The "Personal Directory," which is printed on a cardboard divider in the middle of the book, contains room for 26 services such as CompuServe or The Source, and packet switching networks such as Telenet and Tymnet. Each service has columns for name, telephone number, customer service number, account number, password, network ID, control codes and optimum Baud rate.

Finally, the last section, called the "Telephone Log," is 25 pages long and is designed to help you organize your phone bill. Columns are provided for the date of the call, area code, telephone number, phone company name, destination, time on/off and total cost.

In actual use I found a couple of problems with the BBS Log Book. First and foremost, I found it hard to train myself to make entries into the book everytime I called a board. Without consistent use, the BBS Log Book is practically worthless. Secondly, I found the provided spaces much too small for practical applications. In most cases, I simply used two or even three lines to take notes on the boards' activities. Finally, there is no place to store your passwords to frequently-called systems. The author states that the "password" column "allows you to change your password with each call if you wish." However, when you call a particular board, you are going to have to search backwards through your log until you find your most recent password — hardly an efficient process if you call many boards.

Who would benefit from this book? I would only recommend it to people who are serious and frequent bulletin board users, and thus would benefit from the added organization. However, at $5.95 per copy, almost anyone can afford to buy BBS Log Book to see if it suits his or her personal needs.

(Atmospheres, 1207 Eighth Ave., Brooklyn, NY 11215, $5.95)

— Robert French

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For DISK users, the KEY-264K allows you to alternate between DISK and EXTENDED BASIC on the same side with simple keystrokes. No need to pull your controller or power down. You can be in EXTENDED BASIC on one side and in DISK BASIC on the other side and still switch back and forth and have full communications between the two sides.

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Take A Break With Pause Control Switch

For a CoCo hardware review, this is quite brief, because there is really not much to tell, which is probably appropriate for a "Pause Control."

Pause Control Switch consists of about $2 worth of parts and a one-page instruction sheet. You really do not need more. The parts include an SPST toggle switch, two mini-clips and about nine inches of paired leads connecting the switch to the clips. It is all assembled, and the quality of the soldering and dressing was quite good on the set I reviewed.

You will have to open your CoCo to install Pause Control Switch, and you are properly warned about how this affects your warranty. Once the case is opened, all you do is mount the switch through the cover (you could string it through the back if you didn't want to punch a hole in your computer), and clip the two leads to two well-exposed and safe leads on the ROM-Pak Interface. Thanks to the clips, no soldering is required.

What you have done is tied, in a way, to switch on a "halt" signal to the MC6809E microprocessor any time you want the computer to stop dead in its tracks. Halt forces all the VDG address lines into a high impedance state (engineers call it high-z). The computer is essentially stopped, waiting for direct memory access to drive it. Of course, none will, so the only effect as far as you are concerned is that the computer is stopped — literally frozen at the end of its last clock cycle! By the way, this hard stop will, in no way, harm your CoCo.

What does this do for you? You could pause in the middle of an action game, catch your breath, and resume like nothing had ever happened. This seemed important enough for one video game maker to use a similar halt as their prime advertisement. You could halt directory listings from disks. (Now, that had to make a few of you pause!) See how well it was named?

Computer security? Sure. With the switch on, applying power will get you a screen of graphics and nothing else. Pause Control does nothing if you are inputting with a cassette. Also, you can't pause the analog signal in; otherwise, you can pause the computer in the middle of just about anything!

(The Data'Phile, 207 Melrose Drive, North Syracuse, NY 13212, $14.95)

— Gary Smith

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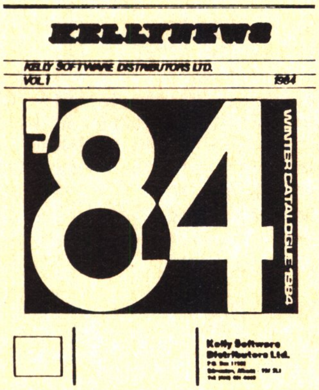
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Shrinx Is An Exceptional Graphics Programming Tool

Shrinx is a utility program that supplements the *Graphicom* program. *Graphicom* is a very powerful and popular high resolution graphics program for the CoCo. (For information on *Graphicom* see THE RAINBOW, April 1984.) *Shrinx* requires a 32K CoCo and one disk drive. Use of up to four drives is supported by *Shrinx*.

A small, well laid out operators manual accompanies the *Shrinx* disk. Using the *Shrinx* manual, the program was up and running quickly. I found one small problem in the boot portion of the manual, it states: "Put the disk that came with this manual into drive 0. Type *Shrinx* and push the ENTER key. Drive 0 will start and you will be greeted with the *Shrinx* menu." This did not work using the standard Disk BASIC. I had to type: `RUN''SHRINX''` then press ENTER.

Following is a list of *Shrinx* commands:

? = Disk Directory — Typing a '?' will list all the binary files on the disk drive currently being used.

M = Menu — Pressing 'M' causes the *Shrinx* menu to appear.

L = Load — Typing 'L' allows you to load binary picture files from a Radio Shack formatted disk.

W = Write — Pushing 'W' permits you to write a picture to a Radio Shack formatted disk.

D = Drive — Typing 'D' allows you to change the drive that is currently being accessed by the Load, Write and Disk Directory commands.

E = Enlarge — The Enlarge function divides the screen into four quadrants. After typing 'E' you are asked which quadrant to enlarge. The quadrant selected is redrawn to cover the entire screen.

S = Shrink — Pressing 'S' scales the original picture into four quarter-frame pictures by deleting horizontal and vertical lines. Each quarter-frame picture is unique because different lines are removed from each frame.

V = Variable Shrink — You can scale a picture to a desired size using the Variable Shrink function.

T = Transfer — The Transfer function allows you to save a picture to a *Graphicom* picture disk.

G = Get — Using the Get command permits you to load a picture from a *Graphicom* picture disk.

The *Shrinx* command structure allows you to easily transfer pictures from Radio Shack formatted disks to *Graphicom* picture disks and vice versa. I found the *Shrinx* program very user friendly. When used in conjunction with *Graphicom*, *Shrinx* can be an exceptional tool for the programmer, artist and/or novice.

(GRAFX, P.O. Box 254, West Mifflin, PA 15122-0254, Disk $29.95 plus $2 S/H)

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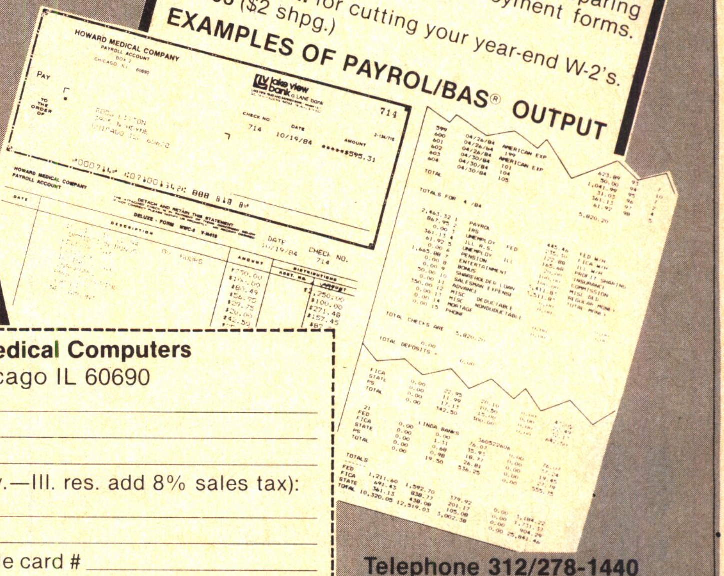

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Software Review

T/S EDIT And *TRSCOPY* Make Editing Effortless

If you have not used a full-screen editing program, you do not know how easy you could have it. Radio Shack has released *T/S EDIT*, a program that makes editing programs a lot easier than using the EDIT command. The first thing you notice when you open the package is that there are two disks. Radio Shack supplies a Disk BASIC version and an OS-9 version in the same package. Besides the two diskettes in the package, a well-written instruction manual is also included. The Disk BASIC version of *T/S EDIT* requires a minimum system of 32K RAM and one disk drive; the OS-9 version requires the OS-9 Operating System, 64K RAM and one disk drive. A notice in the manual states that *T/S EDIT* will run only on the Color Computer; it will not work on an auxiliary terminal. One other thing, all OS-9 users with the 01.00.00 version will have to make a patch before using *T/S EDIT*. The manual very clearly directs you through the patch, even if you have just started with OS-9 and are not really familiar with the system.

The manual walks you through an example. At first it was hard to get accustomed to the command functions, but with a little practice, it became easier. I did have trouble using some of the cursor movement commands, and a call to the local Radio Shack did not provide much help since they had not received a copy of *T/S EDIT* yet. A call to Texas proved to be only a little better; there are a few "bugs" in the disk I received to review. I had trouble using the lowercase command functions, but I was assured these would be corrected in the marketed version.

Some features included in *T/S EDIT* are full-screen editing, true lowercase letters, side scrolling, variable character display size, global editing and multiple file merging. A Hi-Res screen is employed in both versions of *T/S EDIT*. You have 10 different display modes to choose from. These vary from 32 x 16 to 80 x 32. You also have the option of 32 columns being Hi-Res and/or virtual 80 columns with horizontal scrolling. This means you get a 32-column, Hi-Res window with text entered into an 80-column line.

T/S EDIT has a "search and replace" routine that makes you wonder how you got along without it. It makes it very easy to edit a program, i.e., change the output to go to the printer instead of the screen. With just one line, you can replace all PRINTs to PRINT#-2s.

One other command I found very useful was the "Yanking" command. With this, you can move parts of a program from one location to another without deleting the original text. This is good to use when you use the same type of loop in your programming. Auto key repeat is used in the Disk BASIC version, but unfortunately it is not available in the OS-9 version.

If you do not have a full-screen editing program, you should consider Radio Shack's version before you decide on one. It is a good version with an excellent instruction manual. The manual's last three pages are a glossary of the *T/S EDIT* commands, and after you initially go through the manual, the last three pages should be all you will need. The program together with its documentation is written to be used by even the inexperienced programmer.

Also included in my reviewing package was another program called *TRSCOPY*. *TRSCOPY* is used to transfer Disk BASIC text files to OS-9 files and vice versa. It also requires the OS-9 Operating System, 64K RAM and one disk drive. It has a very small manual, at least by Radio Shack's standards, but it is definitely all you will need. The transfer is both fast and painless. You may transfer both text files and programs saved as ASCII files from one operating system to the other, however, *TRSCOPY* moves the files without modification; control and other special characters are copied, but not translated. If you copy a BASIC09 program from OS-9 to Disk BASIC, it will appear as an ASCII file on the disk. You will have to edit it with a full-screen editor or a word processor to, at least, remove the PROCEDURE line at the top of the program.

Again, if you do not already own a full-screen editor or a *TRSCOPY*-type program, these programs deserve your attention. Radio Shack did a good job developing *T/S EDIT* and *TRSCOPY* and more support seems to be around the corner. If you do a lot of debugging, but are not sure you need these programs, then a stop at your local Radio Shack for a demonstration may be in order.

(Radio Shack stores nationwide, *T/S EDIT*, disk $34.95; *TRSCOPY*, disk $24.95)

— Dale Shell

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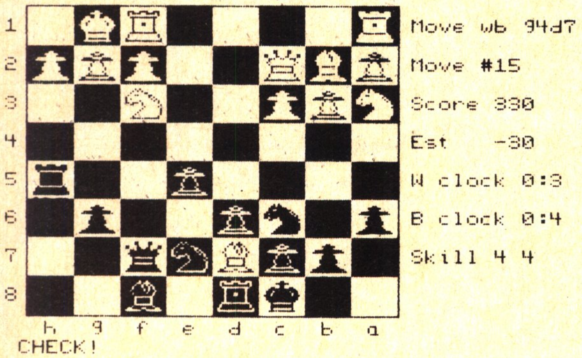

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```

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Omega File: Good Management System With A Price To Match

By Robert Foiles

Omega File is a single disk-based file management system which does not require 64K and allows the user to handle files with records in one file as large as 4,080 characters. Just so we are all talking about the same thing, a *record* is a group of data arranged in data fields or lines, and a *file* is a collection of these records.

This program is designed to permit the user to create individualized records with up to 16 data fields and each field may be constructed to hold from one to 255 characters. Since this is a single disk system, the number of records that can be handled by the program is dependent upon the size and number of fields selected for each record. For example, if the user wishes to create a file with records which each use the maximum 16 fields and each field at the maximum of 255 characters long, then this file would be limited to only 37 records. But, a file with records limited to 10 fields of 20 characters each would allow for about 780 records. The actual file size (e.g., number of records in the file) is limited by the storage space available on the disk in use.

The program allows for sorting of records and a "sort file" is created. Thus, if the user plans to store close to the maximum number of records on a single disk, some planning is needed to leave room on the disk for the sort file. The user might store several small files, with sort files for each, on the same disk with a little planning. However, should it happen that the user didn't do the homework, the program will flash the "Disk storage is getting low!" message on the screen before more data can be entered.

The hardest part of creating a file is the thought that needs to be put into deciding what the records should hold. To get to the task of structuring records for a file, select the Create option from the File Maker Menu. As noted, each record may have up to 16 data fields and each of those fields is to be labeled (up to 10 characters long). The user also sets the length of the data field (up to 255 maximum). In effect, this creates a template for each record to be in the file.

After the form is designed, it is just a matter of typing in the proper information for each record to construct the file. The program author has provided several good examples to follow in setting up the record format and also has provided several worksheets in the back of the manual to facilitate formatting a file.

When the user completes the designing of the record format or wishes to abort the efforts by hitting the '@' key, the program returns to the main menu. From the main menu, the user now has the choice of "using" a file and, once the title is entered, the File Maintenance Menu appears.

To speed up operations of the program, the program author has used the INKEY$ mode, which jumps the program to the next line or option when the designated number of characters is reached or ENTER is hit. After the first

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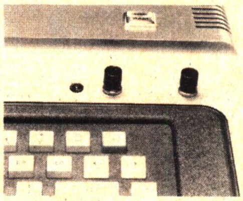

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eight characters of a filename are entered, the program goes right to the Field Maintenance or working menu. Also, while entering the data into the data fields of the records, when the designated number of characters is reached for that field, the program jumps to the next data field. This is fast, but it can cause problems for an inattentive user. However, the user may go into the Change option and correct the error.

At least one problem the user does not have to worry about is the saving to disk of the data. The program takes care of saving to disk as is needed. (But be careful: Upon ending the session, when the program asks if you want to "Save file," answer 'Y' or the program will kill all the records in the file!)

Another speed up method in the program allows the user to repeat an entry in succeeding records by hitting the '@' key while in the data field. The data field will automatically be filled with the information located in the same data field of the preceding record. Repetitive entries are a snap.

The Maintenance Menu now provides the option of either adding records to the file, changing information in individual records, viewing records in sequential order, or calling up a single record by its record number. If desired, deleting any record is possible; however, the record is not actually removed from the file, rather the first line of data is replaced by an '@' and the rest of the data fields are blanked. It appears that once a record is created and then "deleted," it still takes up space in the file and this space cannot be used again. Thus, the user should think about using the Change option to save storage space on the disk.

The Sort option can be used on any one data field within a record, and the line or data field selected will be used as the key for an ascending order "sort file." Only one sort file per file is accepted by the program. If the user changes the sort field, the program will overwrite the old sort file. As noted earlier, if a file is getting close to the maximum number of records the disk can store, there may not be room for a sort file and a DF Error will occur causing the program to hang up. However, several short files with sort files can be on the same disk, depending on storage requirements of each file. The size of the sort file is directly related to the number of records in the file being sorted as the program lists the order of the records by their record number in this sort file.

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The last option in the Maintenance Menu is the Print routine. All printing functions are set to the CoCo default 600 Baud. However, the user has the option of printing to an 80- or 132-column printer.

The output to the printer allows for many configurations. The user may select to have the material printed with or without a heading, with or without records' numbers, all or only some of the data fields, everything printed one line under the other, or each data field following horizontally. The program also provides for a printing of only those records that match the first 25 character string in a selected data field. The user may also decide margins, both top and bottom, and the number of lines between each record. The order in which the data fields are printed out is up to the user. The records may be printed out from the file as they were entered or printed out from the sorted file. Once a print format is set, all the variables are stored by the program. If the user wishes to change any of the optional ways of printing out the file, the program provides that option, too!

The program's biggest drawback is the type used to print the manual: It is a very condensed type (print size one might expect on a legal form!). The material is presented in a logical order and includes samples to follow to get a user started. It would have been helpful if the program author had included information on how to figure the amount of disk storage required by the record size and number of records. It would be even nicer if the program would read the disk and then, based on the record size designed, display on the screen the approximate number of records which might be stored on that disk.

The program makes use of sound to assist the user in the print option, but the use of a beep when the INKEY$ mode jumps to the next line would be very helpful. If the user were copying data from a list and not watching the screen all the time, the sound would be an alert of the line jump. Also, the use of sound with the "Disk storage is getting low!" message would be helpful or better yet, at least keep the message on screen until the user hits ENTER again. Should the maximum disk storage space be reached and the user does not see the message, the DF Error may occur and the program crashes. As noted earlier, if the size of the record is small, the maximum storage space may never be a problem. One option some other systems have, which would be a nice enhancement, is the "Reverse at Comma" option.

A manual printed in a more user-friendly type size and a few more "beeps" at the right time would be the only improvements needed to make this excellent program even better.

(The Other Guy's Software, 875 South Main, Logan, UT 84321, disk $14.95 plus $2.50 S/H)

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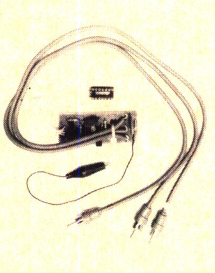

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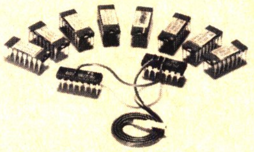

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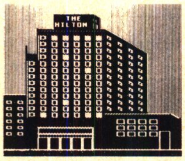

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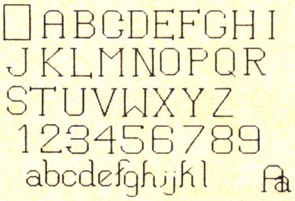

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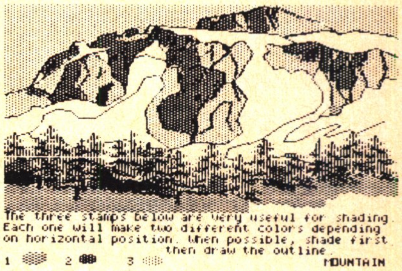
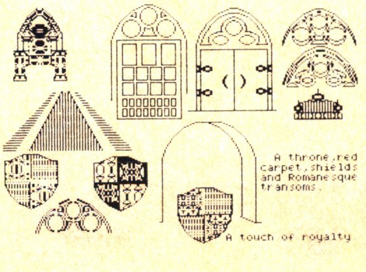


The three stamps below are very useful for shading. Each one will make two different colors depending on horizontal position. When possible, shade first then draw the outline.

△ Adventure Disk II



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Accessory Review

CoCo Cooler II To Help CoCo Breathe Easier

This is one addition your computer will surely welcome, especially if it gets a little hot under the collar at times. The CoCo Cooler II is a device for removing the hot air that can accumulate under the cover of your CoCo 2 due to the heat producing circuitry inside. The Cooler is actually a fan that blows air away from the computer, as opposed to into it. This prevents dust from being blown into the sensitive insides of your machine. The fan is approximately a 1¾-inch tall unit with a 1½-inch square base. It can be fastened to your computer with the double-sided tape on the bottom of the base or by use of the four holes in the corners for a more secure attachment than the tape. The instructions suggest that you place the fan over the power supply, which is a big source of heat buildup.

When I received the Cooler, I noticed that the label attached to it marked the direction the air should flow, but after plugging it into an AC outlet, it was obvious the fan was blowing in reverse. I made a quick call to the local distributor for Spectrum Projects and he in turn called Bob Rosen. It seems that the manufacturer of the units wired some of them incorrectly. This will not hurt the Cooler and is as simple to solve as reversing the two wires that lead to the fan. This is an easy task since a foot or so of the connection is left as two separately insulated wires instead of the two-wires-in-one-insulation type of cord most often used. In general I would have to say that if you have a heat problem with your computer, the CoCo Cooler II is an excellent product that will greatly help, if not totally solve, a heat buildup. By the way, the Cooler II will also help remove heat from overheating disk drives.

(Spectrum Projects, Inc., Box 21272, Woodhaven, NY 11421, or P.O. Box 9866, San Jose, CA 95157-0866, $49.95 plus $3 S/H)

— Jim Sewell

One-Liner Contest Winner . . .

This program draws boxes of various sizes in one corner, then another and another and another. It then moves the four square cones over the screen using the PCOPY command.

The listing:

```
0 PCLEAR8:PMODE4,1:SCREEN1:PCLS1
:FORA=0TO3:DRAW"BM128,96C0A=A;":
FORZ=3TO68STEP2:N=Z/6+1:PLAY"L25
5V31N=N;":DRAW"R=Z;D=Z;L=Z;U=Z;B
H3":NEXTZ,A:FORC=0TO20:FORS=0TO1
:SCREEN1:PMODE4,5-4*S:SOUNDRND(2
55),1:FORY=1TO4:PCOPY Y+S*4TOY-4
*(Y<4)+1-4*S:NEXTY,S,C:RUN
```

Jacques Pannetier
Saint-Laurent, Quebec

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

Software Review

Create Graphics Masterpieces With *Rembrandt*

By Bruce Rothermel

I really like my Color Computer. However, I sometimes look at the capabilities of the newer mega-buck computers with more than a little jealousy. For example, the Macintosh computer has graphics capabilities that make me a little green with envy. Admittedly, the Mac's graphics are monochrome, but they sure are nice.

Well, I'm pleased to report that a program has been released which gives advanced graphics capabilities to the CoCo. Appropriately called *Rembrandt*, this program allows the Color Computer to:

— Draw lines, circles and ellipses
— Fill in areas (paint) in 16 patterns.
— Repeat a pattern from one part of the screen to others (Stamp).
— Enlarge a portion of the screen and edit that area.
— Put text on the graphics screen.
— Save and load pictures.

Rembrandt's graphics utilize the highest resolution PMODE 4 screens with "artifacts" to produce more than the two colors Radio Shack says you can have in this mode. A small BASIC program is included to ensure that the Hi-Res graphics colors are correct.

There are three operation modes in *Rembrandt*. These are the full-screen line-drawing mode, the menu/select mode, and the close-up enlarge/edit mode.

The full-screen line-drawing mode is used to create the general foundation or framework of the picture. The menu modes allow you to select a particular function or parameter by presenting a list of options. The main menu mode has several options, all other submenus are selected from the main menu.

The enlarge/edit mode allows you to "blowup" a portion of the screen for detailed close-up editing. It is used to put the finishing touches on a picture you have created, or to patch errors that would be too tedious to correct in the full-screen mode.

Almost all functions can be controlled by the right joystick. The only time the keyboard needs to be used is to enter text or enter the name of a picture to be saved. In operation, after the program is loaded, you are greeted with the main menu. At this point you have 12 options:

White, Black, Red, Blue, Paint, Circle, Screen Modes, Stamp Function, Enlarge/Edit, I/O Functions, Initialize, or Return.

The first four choices change the current color. The current color is shown with a dot next to it.

Drawing lines is done while in the full-screen mode. The right joystick controls the position of the cursor which is surrounded by a box in the screen. Lines are drawn by tapping the joystick button where you want the line to start and then moving and tapping the cursor where you want the line to terminate.

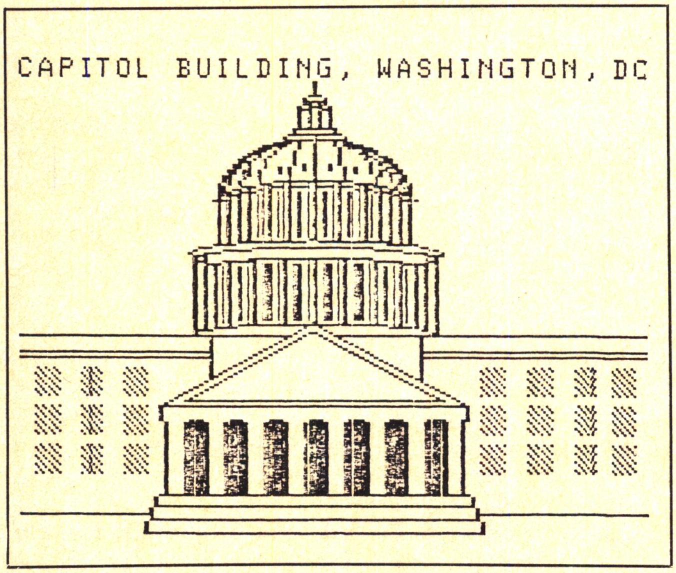
Circles are drawn by tapping the joystick at the center point of the circle. As you hold the button, a circle with an increasing diameter appears. Tapping the button a second time freezes the circle. Moving the joystick left or right, up or down, while the circle is being drawn turns it into an ellipse.

Paint allows you to fill-in any specified area with up to 16 colors and patterns. A nice feature with *Rembrandt* is that you have the option to erase your last command by pressing the CLEAR button.

The last graphics option available from the main menu is the Stamp function. This option allows you to select any 32 x 32 portion of the screen and use it as a stamp to duplicate whatever is in that box anywhere else on the screen. Options allow you to place this stamp on top of or under anything on the screen.

Initialize wipes whatever picture is in memory by painting the current screen in the current color. With many of the options, submenus give you additional options to customize your creation.

Text can be added to your drawing by pressing 'X' on the keyboard. A red graphics cursor then appears. By pressing the arrow keys, graphics can be placed anywhere on the screen. True lowercase with real descenders is possible by pressing SHIFT and 0; this acts as a toggle between caps and lowercase and all capitals.



The mode which makes *Rembrandt* very usable for fine, detailed drawing is the enlarge/edit mode. In this mode, you can select any portion of the screen so it can be enlarged 12 times for detailed examination and editing. Each of the 49,152 pixels (dots) which compose the screen can be individually colored to add detail or correct errors. You always have a reference as to what this enlargement will look like in the actual size version, because beneath the blowup the area being worked on appears in normal size.

The detail that can be obtained in this mode is quite impressive, although filling in the screen one pixel at a time is quite time-consuming, but with the tools offered, very impressive graphics can be created.

The only shortcomings I found were a complete lack of any reference in the tape version regarding how your completed masterpiece can be printed. What good is spending hours creating the ultimate Color Computer graphics if it can only be displayed on a screen? It's quite difficult carrying your CoCo and TV around to show your creation.

The other objection I had is the reaction of the cursor when it is being controlled by the joystick. The block surrounding the cursor moves in the direction of the cursor, but not at the same speed. As you move the cursor, for example, to the upper-left corner of the box, the box drifts in that direction, but at a different speed. This results in a lot of wiggling and overshooting your target on the screen. It takes a little getting used to. It would be nice to have the option of moving the cursor with the arrow keys as well as the joystick.

If you have a 64K Extended BASIC disk system, an advanced version of *Rembrandt* is available. The main advantage of the disk system is the ability to rapidly save and access pictures. Completed graphics are stored on the disk and a small file management program is included to simplify storing and recalling your masterpieces.

The good news is that the disk version, being a later release, includes brief instructions on how to use a screen print program and a dot matrix printer to make a hard copy of your creation. The bad news is that the instructions don't work. Completed pictures have be to loaded into the computer using the BASIC command `LOADM''filename/REM''`, rather than the `LOAD''filename/REM''` instructions given in the manual.

The screen print shown is a greatly reduced reproduction created by one of the demo drawings supplied with the program. While it does not show the brilliant colors obtainable with *Rembrandt*, it gives you an idea of the fine detail available when using the program.

If you are "into" computer graphics, *Rembrandt* seems to maximize the capabilities of the Color Computer. With it, you are able to create graphics and pictures that are otherwise impossible according to Radio Shack documentation. Suddenly that Macintosh doesn't look as good anymore!

(Family Computers, 4047 Bee Ridge Road, Sarasota, FL 33582, cassette $24.95, requires 32K minimum ECB; disk $27.95, requires 64K ECB)

One-Liner Contest Winner . . .

This program, called *Cylinder*, draws some very nice random pictures of cylinders made up of diagonal lines. If the screen doesn't clear the first time, press BREAK and run the program again.

The listing:

```
1 IFR=0THENPCLS:R=64:GOTO1ELSEPM
ODE3+INT(RND(0)+.5):SCREEN1,INT(
RND(0)+.5):COLORINT(RND(8)+.5),1
:FORZ=360TO1STEP-4:C=Z+3.14:C=C*
3.14/180:X=INT(68+R*COS(C)):Y=IN
T(66+R*SIN(C)):LINE(X,Y)-(X+120,
Y+60),PSET:NEXT:IFR<33THENR=64:G
OTO1ELSER=R-16:GOTO1
```

Rolla Price
Sulphur Springs, MO

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

Keep A Computer Calendar With *Don't Forget*

Don't Forget is a disk-based program from Computerware that allows you to construct and maintain an appointment calendar. To start using it, you perform the following steps:

1) Turn on your Color Computer, monitor and printer.

2) Put the program disk in Drive 0.

3) Put a blank formatted disk in Drive 1.

4) `RUN ''REMEMBER''`

5) The program will ask you (on an excellent Hi-Res screen) to say which drive has which disk. It will then ask you whether you are going to use keyboard arrows or joystick.

6) You will then be given a menu. Choose "'Build a new calendar year."

7) Choose the month and year where you want to begin; the program will draw a picture of that month on the screen — one of its talents.

8) Move the cursor to a date and enter. You will be given a "page" with icons (little pictures — the latest rage) at the top, room to enter two lines in a section called "Special Occasions," lines with hour headings to enter appointments, and a section labeled "Memo."

9) Say, on a particular day, you have a dentist appointment at 3:00. Move the cursor to the keyboard icon, ENTER (to show that you are going to type in something), move the cursor to the "3:00" line, type in "dentist" and enter. Is this day Joe's birthday? Move the cursor to Special Occasion and type "Joe's birthday." Now move the cursor to the Memo section and type "pick up cake at bakery for party" and enter.

10) Is that all for this day right now? Move the cursor to the disk icon and enter. Drive 1 will come on and save the data. Move to another day, or another month, and continue for as long as time and patience permit. For example, go through the year and put in all birthdays, anniversaries and holidays. Put in the dates of conferences, vacations, etc. Just remember to save each day's entries to the disk before you leave that "page" or your entries will be lost.

To use the appointment calendar, repeat the steps above, except in step 3 you will put your calendar disk in Drive 1. You can now call any month and date, add other entries and look at what is already entered.

Suppose you want to know what is on the schedule for today. This is the sequence: Turn on your computer, load the program disk and calendar disk, run the program, tell it the program is in Drive 0, that you are using joysticks, that you want February 1985 and that you want to see the 11th. Do you want to have a hard copy? Move the cursor to the printer icon and enter. It will print out just what is on the screen. You can also print out a week's calendar — 7 days from the day you are in.

Another option is to print out a blank calendar for the selected month to use as a scratchpad for appointments to be entered on your calendar disk at a convenient time.

Suppose you changed your dentist appointment to 4:00. You can move the cursor to the 3:00 line and enter, now move the cursor to the scissors icon and enter, and then move the cursor to the 4:00 line and enter. Or, you could move the cursor from the scissors to the trash can icon and enter. It is now deleted. Did you change your appointment to Thursday? Move the cursor from the scissors to the clipboard and enter. It is now saved. Move the cursor to disk and save the revised day. Go back to the February calendar page and select Thursday. Move the cursor to the clipboard, enter, move it to the time of your appointment and enter. Go to the disk icon to save this day.

Does that seem like a complicated way to maintain an appointment calendar for the year? Well, what is the alternative? You will have to go to any stationery store and buy a book which has preprinted calendar pages.

Why would anyone want to use a computerized calendar? Well, if the first thing you do each day is to turn on your CoCo, it is not too hard to run this program first. And don't forget that if your CoCo is a business and office machine, more than one person can use *Don't Forget* — each with his or her own calendar disk. There is also the convenience of setting up the second and succeeding years. *Don't Forget* will copy all the special occasion items onto your new disk for you.

Which system will serve you best? There is an old computer maxim that if a 3 x 5 card will do the job, use it; it is quicker and easier. Is this the case here? As one who must live by an appointment book, I am addicted to one that shows a week on facing pages with a column for each day with hours and half-hours shown, plus room for memos. Each January when I get a new one, I have to go through and put in all the birthdays, anniversaries, etc. The phone rings all day long, and I am constantly checking, entering and altering entries.

Is there anything the program cannot do as well as the book? One thing I do frequently is check back and see when I met with Mr. Jones. With *Don't Forget*, after loading, etc., I can search the calendar by key word and it will give me the calendar pages on which Mr. Jones' name appears. My only other problem was that I could not figure how to show an appointment for 10:30 or 3:15 — all *Don't Forget's* lines show even hours and I could not overwrite them.

Computerware is a large and dependable software vendor and this program's quality is up to their standard. It performs flawlessly and its Hi-Res screen is state-of-the-art. As with most of their offerings, documentation is rather thin, with just enough instructions to get you going. Some little problems we had to work out with some trial and error.

(Computerware, P.O. Box 668, 4403 Manchester Ave., Encinitas, CA 92024, disk $24.95 plus $2 S/H)

— Randy Graham

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Corrections

"Christmas Card File And Labeler" (December 1984, Page 42): James Ball tells us there is a problem with Line 1740. The last statement reads:

```
IFA<LB THEN2080
```

This should be changed to:

```
IF A<LB THEN 1790
```

In addition, the program as presented in the December issue sets aside a five-character space for a ZIP code as used in the United States. Users in some other countries (or who are sending cards to other countries) may need space for a longer postal code. For example, Canada Post uses a code made up of six letters and numerals with a space, so a seven-character space is required. The suggested fix borrows the needed characters from the state/province field, which is adjacent to the postal code field. (This field will now accept only three characters, so the two-character state and province codes set by the Postal Service and by Canada Post will have to be used.)

Make these changes within the following lines:

```
940 MID$(A$(R),60,3)=ST$ . . . MID$(A$(R),64,7)
  =ZIP$
2560 IF LEN(ST$)>4 THEN . . . PRINT''LIMIT TO 3
  CHARACTERS.''
2570 (Add two more spaces between the second pair
  of quotes for a total of seven.)
2580 IF LEN(ZIP$<>6 THEN... PRINT''ENTRY ERROR''
2870 IF LEN(ST$)<3 THEN . . .
2940 ST$=MID$(A$(R),60,3)
2960 ZIP$=MID$(A$(R),63,7)
```

These changes should be sufficient for a seven-character postal code. Further expansion is possible using an analogous procedure. If you've entered data under the original version and then make these changes, your original information will be incorrectly displayed. The easiest way to rectify this is to edit each record accordingly.

"A Simple Text Processor" (January 1985, Page 103): Ashok Basargekar tells us that several of the ROM calls are not compatible with Radio Shack's Disk BASIC 1.1 ROM. (This ROM is found in the disk controller, and the problem has no connection whatsoever with the ROMs in the computer itself.) These changed ROM addresses (which appeared on Page 160 of the March 1984 issue) should serve as a guide to modifying the program:

1.0 ROM	1.1 ROM	Function
C468	C48D	Open file
C6C5	C6F5	Kill file
C8A4	C952	Process filename
CA3B	CAE9	Close all files
CA53	CB01	Close file
CBD2	CCB2	Directory
CEA2	CF7E	SAVEM
CF07	CFE3	LOADM

Note that these changes apply only if you have the new Disk BASIC ROM; the modified program will not work with the old ROM.

Also, if your computer has Color BASIC 1.2 or 1.3 (`EXEC 41175` to find out), the calls to the keyboard routine at $A1C1 should be changed to $A1CB. This change should not affect operation on computers having the old 1.1 Color BASIC ROM.

For those who get the RAINBOW ON TAPE, make the following `POKE`s after `CLOAD`ing the text processor:

```
POKE &HE83,&H27
POKE &HFB6,&H5C
POKE &HFB7,&H81 : POKE &HFB8,&H0D
POKE &HFB9,&H27 : POKE &HFBA,&H23
CSAVEM or SAVEM ''TEXTPRO'',&HE00,&H16CD,&HE00
```

For those who have assembled the source listing, make the following corrections to the source listing and reassemble the program:

Line 00920: `CMPY <$27` Top of RAM reached?
Add Line 02745: `INCB`
Delete Line 02770: (`INCB` instruction is moved up two instructions.)

"The Art of Joystick Painting" (October 1984, Page 97): Brian Preble tells us that a couple of problems have arisen with the program *Sketch*. First, the SN Error you often get when running the program is caused by the notorious `PCLEAR` bug in the old Extended BASIC ROM. Just enter `RUN` again to start the program. (If you have the new Extended BASIC 1.1 ROM, you should not have this problem.) Secondly, the garbage that appears when the program is first run is normal. Since *Sketch* was designed to work with pictures created by other programs, it doesn't clear the graphics screens when you start it. If this bothers you, just type `PCLS` before running it.

CoCo Cat

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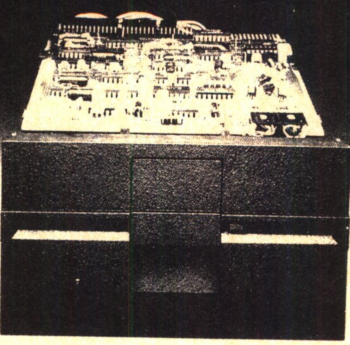

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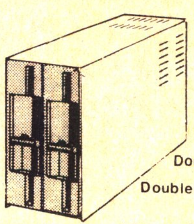

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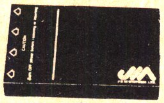

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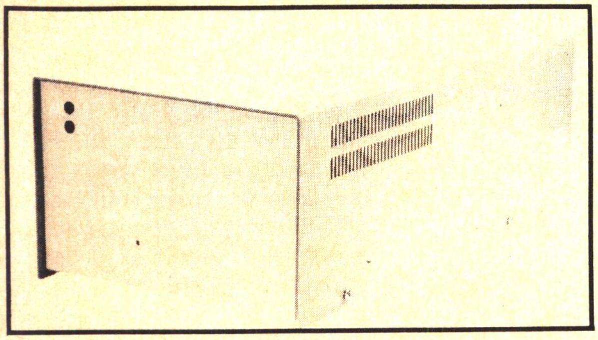

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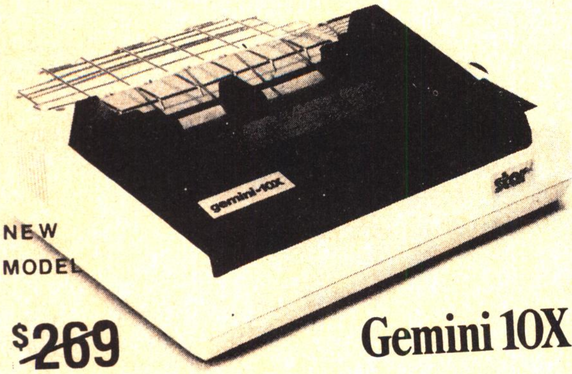

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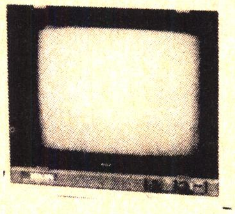

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PROGRAMMING TUTORIAL 16K ECB

The author contends that people — especially children — are likely to stay with a program longer if joysticks are used for input. Test his theory on this joystick menu and see if you agree.

Joystick-to-itiveness

By T.C. Taulli

This tutorial shows you the advantages of incorporating joysticks in all your programs. I have also provided a program to give you a taste of the joystick menu.

Here are seven advantages:

1) People find inputting with joysticks easier because all the options are in front of the person. There's no way a person will get a syntax error.
2) Inputting a number is less error prone. People don't have to keep reaching up on the keyboard when typing.
3) It's easier for kids and adults. Most kids don't like learning the different commands keyboard input programs have. And adults don't have two hours to spend studying what the game will do if you press a certain key.
4) Joysticks will make your program more entertaining, enjoyable and user-friendly. This will help people improve what they're doing instead of being bogged down by the tiring process of keyboard input.
5) It's easier for people who can't type. And, since the average kid can't type, more kids will buy joystick controlled games. When you add up all the adults and kids that want your joystick controlled program, you will have a big market for your program.
6) If you have played a multiple-player game, you know how hard it is to keep maneuvering when it's your turn at the keyboard. With joysticks, people can play multiple-player programs faster. Even sharing a joystick would be more practical than using the keyboard.
7) Joysticks are just plain fun.

If you're convinced joysticks will make your game a "cut above the rest," then type in the program below or buy RAINBOW ON TAPE (if you haven't already).

The program listing below is a joystick controlled menu that can be used to choose parameters for Adventure games. If you use a joystick menu in your Adventure, it would come after all the data has been read and after the title screen. You can do what you want, and feel free to use any of my ideas in this short program.

If you don't know how to use the skill level routine, then read on. In order to pick a skill level, put the cursor by the skill level you want and press the joystick button. The skill level will be switched into inverse video. This is so you know which skill level you selected and you won't keep choosing a skill level you've already selected.

The joystick menu is good for any program. It will make Simulations easier and cleaner. It will also make Adventures better. But, you might ask yourself, "Why do I need joysticks in my Adventure? Adventures are played by inputting commands from the keyboard." Well, it will still give you an edge over standard Adventure games and the *Third Annual Rainbow Adventure Contest* is being launched this month!

(T.C. Taulli is the author of the game Do or Die, *and is a member of Color America Users Group.)*

200	112
304	220
1900	12
END	144

The listing:

```
1 S=1:TU=50:CLS3
2 PP=1:GOSUB7000
```

```
3 CLS3:PRINT@12,"OPTIONS:";:GOTO
80
40 'THIS IS WHERE THE SECOND MEN
U IS PRINTED
50 FORX=1TO250:NEXT:PRINT@225,"L
OAD IN SAVED GAME";
52 PRINT@289,"CHANGE MENU ONE";
53 PRINT@321,"START THE ADVENTUR
E";
56 PRINT@492,"TURNS:";TU;
61 PRINT@257,"PICK TURNS";:GOTO2
46
70 'THIS IS WHERE THE FIRST MENU
 IS PRINTED
80 FORX=1TO250:NEXT:PRINT@65,"SK
ILL LEVEL ONE";
81 PRINT@97,"SKILL LEVEL TWO";
82 PRINT@129,"SKILL LEVEL THREE"
;
83 PRINT@161,"GO TO MENU TWO";
84 IFPP=1THENPRINT@65,"skill lev
el one";
85 IFPP=2THENPRINT@97,"skill lev
el two";
86 IFPP=3THENPRINT@129,"skill le
vel three";
200 FOR X=1TO250:NEXT
201 E=JOYSTK(0):O=JOYSTK(1):IFO<
4THENO=4'THIS IS WHERE YOU PICK
FROM MENU ONE
202 IFO>11THENO=11
203 SET(1,O,5)
232 B=PEEK(65280)
234 IFB=254ORB=126THEN238
236 SET(0,O,3)
237 GOTO201
238 SET(0,O,3):IFO=4THEN400
239 IFO=5THEN400
240 IFO=6THEN500
241 IFO=7THEN500
242 IFO=8THEN600
243 IFO=9THEN600
244 IFO=10THEN700:IFO=11THEN700
245 GOTO50
246 FOR X=1TO250:NEXT'THIS IS WH
ERE YOU PICK FROM MENU TWO
247 Z=JOYSTK(0):Y=JOYSTK(1)
248 IFY<14THENY=14
249 IFY>21THENY=21
250 SET(0,Y,5)
251 B=PEEK(65280)
252 IFB=254ORB=126THEN300
254 SET(0,Y,3)
256 GOTO247
300 SET(0,Y,3):IFY=14THEN900
301 IFY=15THEN900
302 IFY=16THEN950
303 IFY=17THEN950
304 IFY=18THEN1000
305 IFY=19THEN1000
306 IFY=20THEN9099
307 IFY=21THEN9099
400 PP=1:GOTO80
500 PP=2:GOTO80
600 PP=3:GOTO80
700 GOTO245
900 FORX=1TO250:NEXT:GOTO1900
950 'THIS IS THE TURN ROUTINE
951 PRINT@384,"POSITION STICK FU
LLY UP TO       INCREASE TURNS OR
 FULLY DOWN TO DECREASE YOUR TUR
NS";
953 PRINT@491,CHR$(143+80);
954 PRINT@498,TU;
955 JJ=JOYSTK(0):JY=JOYSTK(1)
960 IF JY=0 THEN TU=TU+1
961 IF JY=63 THEN TU=TU-1
962 IF TU>110 THEN TU=110
963 IF TU<40 THEN TU=40
964 FORX=1 TO 50:NEXT
965 B=PEEK(65280)
966 IFB=254ORB=126THEN968
967 GOTO954
968 PRINT@491,CHR$(143+32);:GOTO
50
1000 GOTO80
1100 GOTO10000
1900 CLS
2000 PRINT"THIS IS WHERE YOU WOU
LD HAVE    A SUBROUTINE THAT LOA
DS IN A    SAVED GAME"
2001 PRINT:PRINT"PRESS JOYSTICK
TO GO BACK TO THEBEGINNING"
2002 B=PEEK(65280)
2003 IFB=254ORB=126THEN1
2005 GOTO2002
7000 FORX=1TO250:NEXT:PRINT@0,"*
 *  T H E   J O Y S T I C K  * *"
;
7001 PLAY"O5L34DEDEDEDEDEDEDEDED
EDEDEDE":PRINT@75,"TUTORIAL";
7002 PRINT@134,"****BY TC TAULLI
****";
7003 PRINT@192,"PRESS THE RIGHT
JOYSTICK BUTTON TO SEE THE JOYST
ICK MENU PROGRAM";
7004 PRINT@458,"**(C) 1984**";
7030 B=PEEK(65280)
7040 IFB=254ORB=126THENRETURN
7070 GOTO7030
9099 FORX=1TO250:NEXT
10000 CLS:PRINT"THIS IS WHERE TH
E ADVENTURE     WOULD START"
10001 PRINT:PRINT"PRESS JOYSTICK
 TO GO BACK TO THEBEGINNING"
10010 B=PEEK(65280)
10020 IFB=254ORB=126THEN1
10030 GOTO10010
```

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RAINBOW Info

How To Read Rainbow

Please note that all the BASIC program listings you will find in THE RAINBOW are formatted for a 32-character screen — so they will show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little cassette symbol on listings indicates that program is available through our RAINBOW ON TAPE service. An order form for this service is on the insert card bound in the magazine.

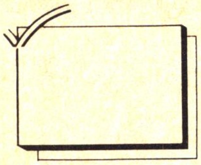
What's A CoCo

CoCo is an affectionate name which was first given to the TRS-80 Color Computer by its many fans, users and owners. As such, it is almost a generic term for three computers, all of which are very much alike.

When we use the term CoCo, we refer to the TRS-80 Color Computer, the TDP System-100 Computer and the Dragon-32 Computer. It is easier than using the three "given" names throughout THE RAINBOW.

In most cases, when a specific computer is mentioned, the application is for that specific computer. However, since the TDP System-100 and TRS-80 Color are, for all purposes, the same computer in a different case, these terms are almost always interchangeable.

The Rainbow Check Plus



The small boxes that you see accompanying programs in the THE RAINBOW are the "Check system," which is designed to help you type in programs accurately.

Rainbow Check PLUS will count the number and values of characters you type in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use the *Rainbow Check PLUS*, type in the program and CSAVE it for later use, then type in the command RUN and press ENTER. Once the program has run, type NEW ENTER to remove it from the area where the program you're typing in will go.

Now, whenever you press the down arrow key, your CoCo will give you the checksum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure that you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK (35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
      ‘‘DATA ERROR’’:STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

Using Machine Language

Machine Language programs are one of the features of THE RAINBOW. There are a number of ways to "get" these programs into memory so that you can operate them.

The easiest way is by using an Editor-Assembler, a program you can purchase from a number of sources.

An editor-assembler allows you to enter mnemonics into your CoCo and then have the editor-assembler assemble them into specific instructions that are understood by the 6809 chip that controls your computer.

When you use an editor-assembler, all you have to do, essentially, is copy the relevant instructions from THE RAINBOW'S listing into CoCo.

Another method of getting an assembly language listing into CoCo is called "hand assembly." As the name implies, you do the assembly by hand. This can *sometimes* cause problems when you have to set up an ORIGIN statement or an EQUATE. In short, you have to know something about assembly to hand assemble some programs.

Use the following program if you wish to hand assemble machine language listings:

```
10 CLEAR200,&H3F00:1=&H3F80
20 PRINT ‘‘ADDRESS:’’;HEX$(I);
30 INPUT ‘‘BYTE’’;B$
40 POKE I,VAL(‘‘H’’+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the &H3F00 in Line 10 to &H7F00.

The Rainbow Seal

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SEAL

The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product which carries the Seal has been physically seen by us and that it does, indeed, exist.

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The Seal, however, is not a "guarantee of satisfaction." The certification process is different from the review process. You are encouraged to read our reviews to determine whether the product is right for your needs.

There is absolutely no relationship between advertising in THE RAINBOW and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to *any* commercial product, regardless of whether the firm advertises or not.

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6809 Arithmetic — The Way It All Adds Up

By R. Bartly Betts
Rainbow Contributing Editor
With Programs By Chris Bone

So far this column has dealt with reading and writing, but very little arithmetic. If your education is to be well rounded, it is time to take a look at assembly language calculations.

Chris and I have very different opinions in the area of arithmetic. He thinks life begins and ends with figures, calculations, algebra, trigonometry and the like. I think such things are closely related to the black plague and there should be an inoculation against them.

But duty calls and, whether for good or bad, arithmetic is essential in assembly language.

The Honor Roll

But wait, let's postpone the dreadful for a moment. Even more important than calculations is the need to recognize those who have answered the first challenge put forth by this column. If you still remember, the job was to create text on your display screen, then change all letter A's to asterisks. We had a number of good replies, and planned to announce the winner of the challenge sooner, but two factors caused postponements. First, the replies kept trickling in for quite awhile, and second, neither Chris nor I could decide who was a clear winner. Many of you did very well.

Both problems are now solved. First, no new programs have come in this month, (I am writing this in December) and second, we have created an honor roll of the best programs (at least I think the list is complete). If you submitted a program that worked well, and do not see your name, either the post office or I must have lost it, and the guilty party might be me.

I am still trying to get my computer work space arranged since moving to Texas. So far I have had it in four different places, and I have enough "junk" to fill a room (four computers, two printers, monitors, drives, books and books and books, power bar, tools, an oscilloscope, and pieces and bits). As I think my equipment has finally found a permanent home, I now have to work on my filing system.

But now, the winners are, in no particular order:

William A. Smith — USS THORN (DD 988) FDP Miami, Fla.
H. B. "Zack" Zachry — Midwest City, Okla.
Kevin Deneen — (Sorry, Kevin, I lost your address)
Al Clarke — Seattle, Wash.
Robert E. Cutter — Los Angeles, Calif.
Shawn Jack — Ooreville, Ill.
John R. Spencer — Lancaster, Penn.
George A. Rost — Lawndale, N.C.

Congratulations and thank you for your submissions.

Addition

With the fun part over, it's time to get back to arithmetic. As you know, your editor/assembler has several math-oriented operation codes. And, despite my reluctance to admit it, additions and subtractions are the foundation of assembly language programming.

Either an 8- or 16-bit operation is 6809 addition that adds the contents of a register to a specified number or memory location. The operation can use either accumulator 'A' or 'B', in 8-bit functions, or both 'A' and 'B' (register 'D'), in 16-bit functions. The following example demonstrates the ADD operation:

(R. Bartly Betts is currently a technical writer for Tandy Corp. and is a former news reporter and magazine editor. As the father of 10 children, computers are his escape from reality.

Chris Bone is a college computer science major and has been programming for more than three years. He averages between six and nine hours a day on the CoCo.)

```
        00100 START   ORG       #$7000
        00110         LDA       #50       *PUT 50 IN A
        00120         STA       $400      *STORE AT
$400
        00130         LDA       #100      *PUT 100 IN
A
        00130         ADDA      $400      *ADD
LOCATION $400 TO A
        00140         STA       $402      *STORE THE
RESULT AT $402
        00150 END     SWI
        00160         END
```

I chose memory location $400 and $402 to store the values of 50 and 150 so you can see what is going on. Hex 400 is the beginning of the text screen, and anything stored there appears at the top left-hand corner of your video screen. Memory location $402 is two columns to the right on the top row of your screen. Of course, the program moves too fast to see anything but the result, which is the storage of 50 and 150 at the top of the screen. The value of 50 is represented by a reverse number 2 and 150 is represented by a graphic symbol.

Use the AO (absolute origin) switch to assemble the program to memory. Then, to test the program, type 'Z' to enter `ZBUG`. Press `CLEAR` so the screen won't scroll, then type `GSTART` to run the program. You can verify the display screen results by typing 'R' to examine the registers. Remember the register values are in Hex.

The Direct Approach

As well as using the ADD op code in extended addressing, you can also use it in direct addressing, such as this program:

```
        00100          ORG       $7000
        00110 START    LDB       #72      *LOAD B WITH
72
        00120          STB       $400     *STORE B AT
$400
        00130          ADDB      #1       *ADD 8 TO
THE VALUE IN B
        00140          STB       $402     *STORE THE
RESULT OF THE ADD IN $400
        00150          SWI
        00160          END
```

In this case, one is added directly to the value already stored in accumulator 'B'. Lines 120 and 140 are only included so you can see the results of the operations.

Adding More Bits

While 8-bit additions can be accomplished in either the 'A' or 'B' register, 16-bit additions require both 'A' and 'B', or the 'D' register. To see how 16-bit additions work, try this program:

```
00100          ORG       $7000
00110 START    LDD       #$332B
00120          STD       $400
00130          LDD       #$343D
00140          STD       $402
00150          ADDD      $400
00160          STD       $4004
00170          SWI
00180          END
```

Load and execute the program as before. Again, additions in the 'D' register can be either extended or direct. In the above operation, the Hex number 332B is loaded in 'D', then 'D' is stored in memory location $400. This puts $33 in location 400 and $2B in location 401. Then $343D is loaded in 'D' and 'D' is stored in $402. This puts $34 in 402 and $3D in $403.

The number stored at $400 and $401 is then added to the number in 'D' and the result is stored at $404. Again screen memory is used for storage so you can see the results.

A Bit of Subtracting

I am pleased to announce that subtraction works exactly like addition, except! The "except" is a fairly major one, however, and introduces an important concept in computer number handling.

But, before we get into the complicated, let's look at some of the things that are easy. The following program accomplishes a simple subtraction, using a memory location and the 'A' accumulator.

```
        00100          ORG       $7000
        00110 START    LDA       #100      *LOAD 100 IN A
        00120          STA       $400      *STORE A AT
$400
        00130          LDA       #200      *LOAD 200 IN A
        00140          SUBA      $400      *SUB THE VALUE
AT $400 FROM THE VALUE IN A
        00150          STA       $402      *STORE THE
RESULT AT $402
        00160          LDB       #255      *LOAD 255 IN B
        00170          SUBB      #55       *SUBTRACT 55
FROM THE VALUE IN B
        00180          STB       $404      *STORE THE
RESULT AT $404
        00190          SWI
        00200          END
```

This program first loads accumulator 'A' with the value of 100. The value is then stored in memory location $400. Next 'A' is loaded with the value of 200, then the value at memory location $400 is subtracted from 'A' to give a result of 100. This is stored at memory location $402.

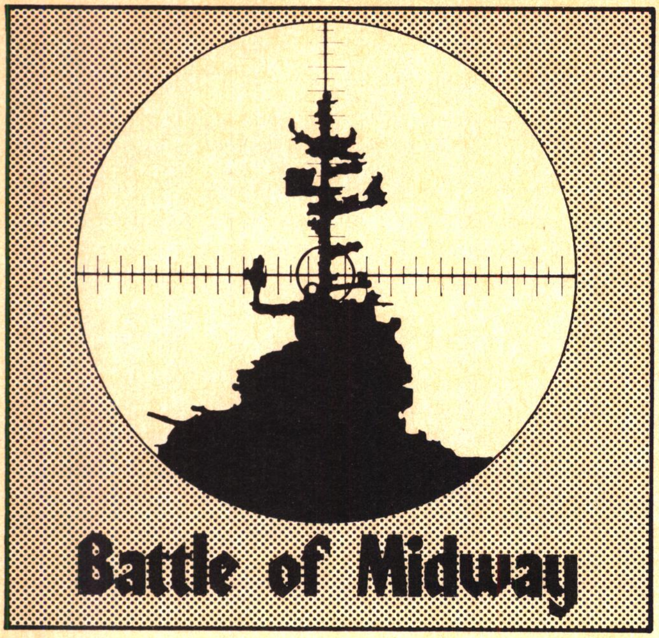
Next, 'B' is loaded with a value of 255. Then the value of 55 is subtracted directly from 'B', leaving a value of 200, which is subsequently stored in memory location $404.

So far everything appears to operate the same as in addition. But what if the number subtracted from a register is larger than the value in the register? How does your computer handle negative values? So far we have been working with "absolute values," but as my accountant well knows, computers have to be able to handle negative amounts.

Two's Complement

The secret to handling negative numbers lies in a procedure called "two's complement." In the two's complement format, the most significant bit (the leftmost bit) of a binary value is set aside as a "sign bit." That is, if the MSB is zero, then the number is positive and, if the MSB is one, the number is negative.

To calculate a negative value using two's complement, first subtract the numbers using normal methods, then change all of the binary ones to zeros and all the zeros to ones and add one. This is purely a mechanical process that gives the proper result. Before showing exactly how the mechanical calculations work, however, let's delve into a bit of theory.



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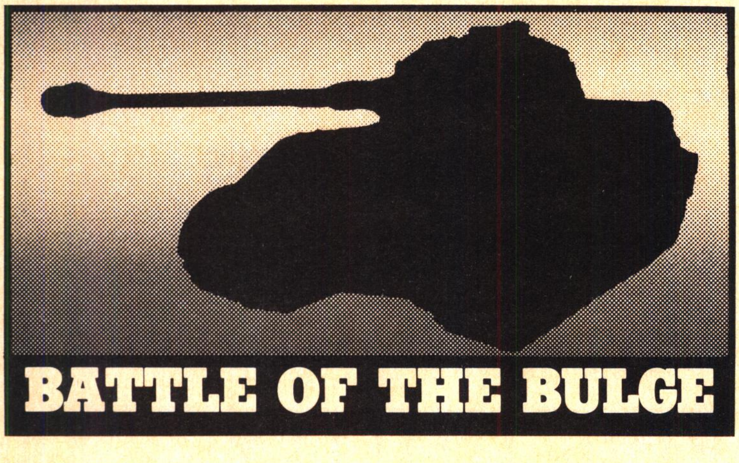

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When you reserve the MSB of a binary number as a sign bit you have actually reduced the value that number is capable of storing by half. To see this, look at the 8-bit binary number 11111111. This number in decimal is 255, 128+64+32+16+8+4+2+1. When you reserve the first bit as sign bit you have the binary number 1111111, or 127 in decimal.

In fact, some computers represent numbers in this way. On the Radio Shack Model 3, numbers above 32,768 are represented as negative numbers. The highest memory location is -1, rather than 65536. There isn't room to show you how such a number is formatted but, using a maximum value of 19 rather than 65536, the following chart shows how you can count to 19 with such a method:

```
0 1 2 3 4 5 6 7 8 9 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1
```

With this method, -9 now represents 11, -5 represents 15, and -1 represents 19.

To show you how two's complement can accomplish the job of subtracting, let's subtract the binary number 10 from 5. In decimal, it looks like this:

```
    5
  -10
------
   -5
```

In 6809 binary, when the two numbers are subtracted, the result is:

```
     0101       5  decimal
     1010     -10  decimal
------------
     1011       3  decimal, with a sign bit of
1
```

So far, aside from the number being negative, things don't look too good. But, let's do a two's complement operation on the result to complete the operation:

```
  0100        Swap 0's for 1's and 1's for 0's
    +1        Add 1
------
  0101        5 decimal
```

That looks better and, even more impressive, it is correct. For simplicity in this example, only 4-bit numbers were used. The process is exactly the same for larger, 8-bit or 16-bit numbers, however.

By now you probably wonder how your 6809 knows whether you are operating in two's complement mode or in absolute numbers. The answer to the question is that it doesn't, but you do (at least you should). Just to be on the safe side, the 6809 always acts as though two's complement is being used and outputs the necessary information. If you don't need two's complement, you can ignore the signs that the processor sends out. If you need two's complement, you can make use of the signs.

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To see what happens with such an operation, type in and assemble the following example:

```
00100           ORG        $7000
00110 START     LDA        #100
00120           STA        $E00
00130           LDA        #50
00140           SUBA       $E00
00150 END       SWI
00160           END
```

Use ZBUG to run the program as you did on the earlier examples. When you have run the program, type 'R' to examine the registers.

Remember several months ago when I told you that you could ignore the Condition Code register for awhile? Well, now you need to know that the flags for negative operations are kept in the Condition Code register. The best way to see this is to execute the program again, but this time single step through it.

To single step, first assemble the program in memory without errors. Then go to ZBUG and type START,. The comma tells ZBUG you want to single step the program beginning at START. Enter a comma every time you wish to implement a new step.

After each step you can look at the registers by entering 'R'. Examine the registers after lines 00110 and 00140 (remember, the last line displayed in the single step mode is the next one to be executed). At Line 00100 you get a register display similar to the following:

```
#Z
#R

A = 64  B = 00  DP = 00  CC = 81 = EC
X = 0000  Y = 0000  U = 0000  S = 0000
PC = 700A
```

You need to pay special attention to the condition code flags. At this stage flags 'E' and 'C' are set (CC 81 EC), but neither of these flags are of concern to us now. Next, step through Line 00140 and examine the registers again. The display should now look like this:

```
#Z
#R

A = CE  B = 00  DP = 00  CC = 89 = ENC
  Bytemaster Column
  Article Number 7




X = 0000  Y = 0000  U = 0000  S = 0000
PC = 700A
```

A new condition flag is now set, the 'N' flag. If a subtract operation results in a negative value, the 'N' flag is set. If a subtract operation results in a zero, the 'Z' flag is set. If the result is positive, neither 'N' nor 'Z' is set. A flag is considered set if it equals one and is considered reset if it equals zero.

The subtract operation is now complete, but you can see that register 'A' does not hold the correct answer. Subtracting 100 from 50 should not give a result of $CE or 206 decimal. Now two's complement can save the day. To get the right answer, add two more lines to your program:

```
00142        COMA                 *COMPLEMENT A
00144        ADDA       #1        *ADD 1 TO A
```

In the subtract operation, knowing that the CC 'N' flag is set lets you know the resulting value must be complemented and increased by one to get the right answer. Executing the program after the addition of these lines produces the right answer (50 decimal or 32 Hex) in the 'A' register.

Next month we will complete the look at addition and subtraction operations, and delve into comparison operations, multiplication and division. For now, experiment with addition and subtraction as far as we have gone and feel free to strike out on your own. The things you discover for yourself will be remembered much longer than those things you read about in a book.

Although we are not yet far enough along, Chris and I are working on some more neat programs to give you practical examples of what you are learning.

You can contact either Chris or me by writing or calling: 2251 Lipscomb, Fort Worth, TX 76110; Phone (817) 924-3725.

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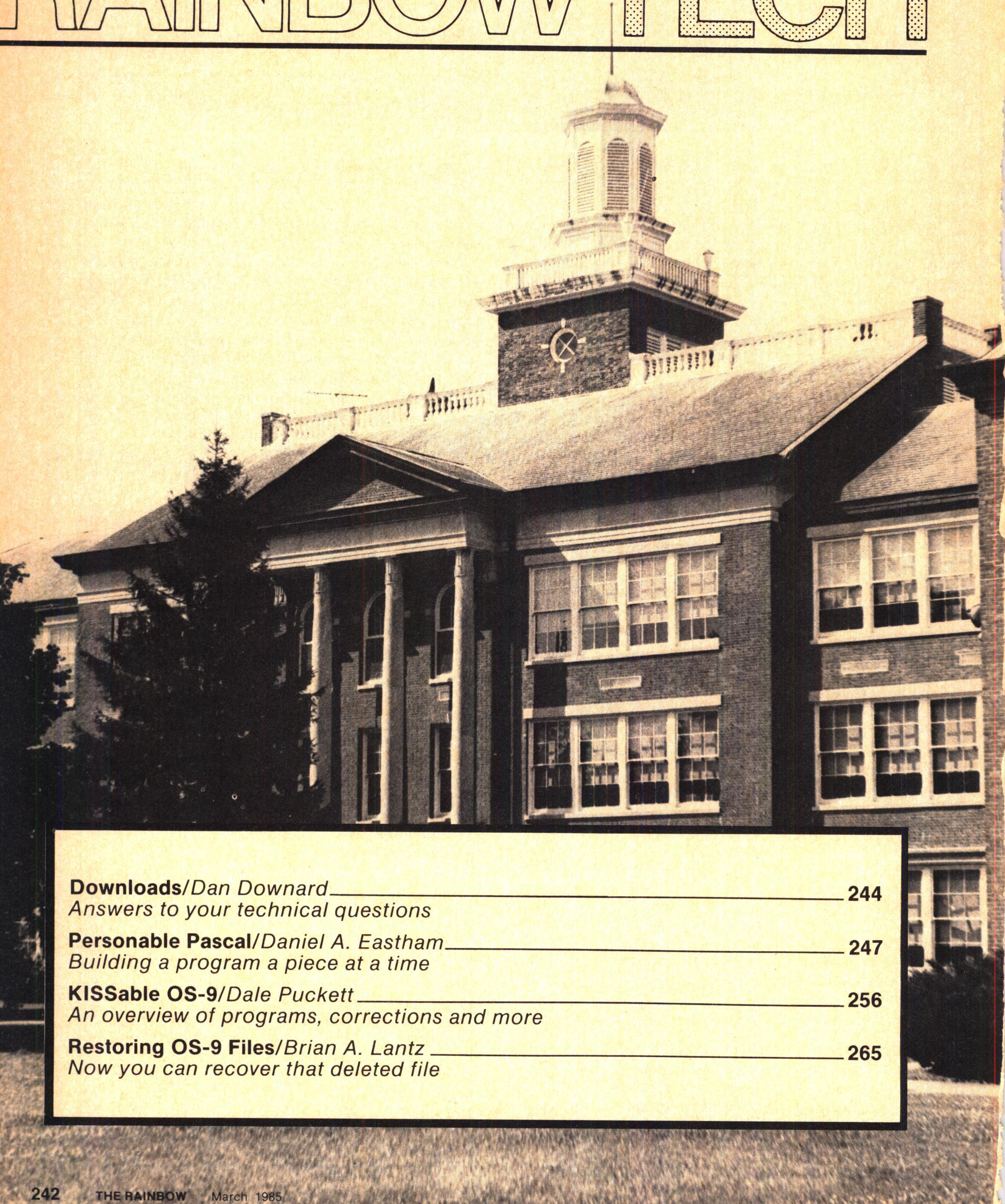

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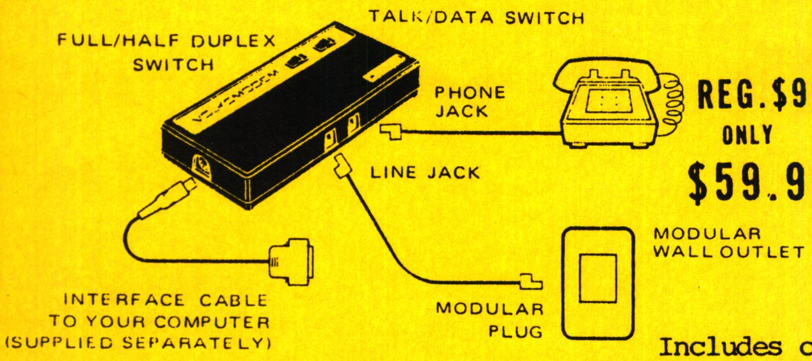

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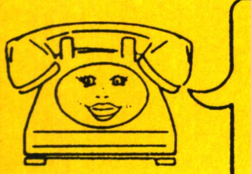

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A Cure For The Baud Bug

By Dan Downard
Rainbow Technical Editor

• *This letter is prompted by a question in your December column concerning running a printer at 9600 Baud under OS-9. I purchased OS-9 several months ago and found the bug in question right away. I notified Tandy Software Support and supplied them with the correction, but apparently they have not made it available to users yet (probably because their printers do not run above 2400 Baud!). I am sure many of your readers would appreciate the following information. You are free to use it as you see fit, however, I would ask if you publish it to please mention where you got it (like many of us, I enjoy seeing my name in print occasionally).*

For those who are interested in the more technical aspects, the problem results from errors in the Baud rate delay table in the OS-9 device driver module PRINTER (one more example of the disadvantages of a "bit-banging" serial port). The delay counts for 4800 Baud and 9600 Baud are just a bit too large, causing the software to elongate the bit time to the serial port.

This occasionally causes the printer (specifically its serial interface) to lose bit synchronization and see two zero or one bits in a row when OS-9 only intended to send one. This smattering of extra bits is what fouls up the transmission of the characters enough to cause the garbage on the printer at rates above 2400 Baud. The original counts and my corrected counts are as follows:

	4800 Baud	9600 Baud
Original	$0016	$0008
Corrected	$0014	$0006

I have tried the 4800 Baud setting without difficulty, and I have been driving my Gemini 10-X at 9600 Baud under OS-9 for several months now with no problems whatsoever. I have used XMODE *and* COBBLER *to alter my boot file so the default Baud rate for /P is 9600, allowing me to alternate between OS-9 and Radio Shack Disk* BASIC *without changing any settings (I have a system initialization program that, among other things, sets the* BASIC *Baud rate to 9600, also).*

Fixing the problem is very simple. The following list of commands contain a step-by-step scenario for changing the constants and creating a new bootfile. Of course, make sure you apply the fix to a copy of your OS-9 disk. After booting from the corrected disk, TMODE and XMODE settings of 4800 or 9600 Baud for device /P should function properly.

One important note of caution: Be careful that any software that modified itself or other OS-9 modules dynamically is not active when you execute the COBBLER *command. If it is, it can result in a non-bootable disk! One package I have that does this is the Hi-Res screen in* O-PAK *from Frank Hogg Labs. If you have it, make sure Hi-Res is not in the system while you apply this fix. Afterward, you can start Hi-Res again.*

```
OS9: DEBUG <ENTER>
INTERACTIVE DEBUGGER
DB: L PRINTER <ENTER>
    EADF 87
DB: . .+6A <ENTER>
    EB49 16
DB: =14 <ENTER>
    EB4A 00
DB: - <ENTER>
    EB49 14
DB: . .+2 <ENTER>
    EB4B 08
DB: =06 <ENTER>
    EB4C 34
DB: - <ENTER>
    EB4B 06
DB: . .+5A <ENTER>
    EBA5 31
DB: =6F <ENTER>
    EBA6 6E
```

```
DB: =76 <ENTER>
    EBA7 57
DB: =AA <ENTER>
    EBA8 87
DB: . .-3 <ENTER>
    EBA5 6F
DB: <ENTER>
    EBA6 76
DB: <ENTER>
    EBA7 AA
DB: Q <ENTER>
OS9: IDENT PRINTER -M <ENTER>
HEADER FOR:  PRINTER
MODULE SIZE: $00C9     #201
MODULE CRC:  $6F76AA (GOOD)
HDR PARITY:  $12
EXEC. OFF:   $0016     #22
DATA SIZE:   $001F     #31
EDITION:     $01       #1
TY/LA AT/RV: $E1 $81
DEV DVR MOD. 6809 OBJ, RE-EN
OS9: COBBLER /DO <ENTER>
WARNING - FILE(S) OR KERNEL
PRESENT ON TRACK 34 - THIS
TRACK NOT REWRITTEN.
OS9:
```

Christopher Blum
Nova, OH

Thanks for the tips, Christopher. I guess I caused a little confusion by not distinguishing between input and output when discussing timing. You can indeed use this patch to correct the printer Baud rate, but it is not applicable for remote input, such as from the RS-232 port.

CREATE BUFFERS WITH OS-9

• *I own a Color Computer and a disk drive. I am interested if there is a way, with software, to give the CoCo a keyboard buffer like IBM computers have? You have a great magazine, keep it up.*

Victor Capton
Troy, MI

A keyboard buffer is available for your

(Dan Downard is an electrical engineer and has been involved in electronics for 24 years through ham radio [K4KWT]. His interest in computers began about five years ago and he has built several 68XX systems.)

CoCo using OS-9, Victor. Color BASIC uses a method of keyboard input called polling where the keyboard is scanned at intervals for a key depression. To enable a keyboard buffer, the hardware, and software, inside your CoCo would have to be changed.

Buffers usually are based on what is called interrupt-driven software. When a key is depressed using this scheme, an interrupt vectored subroutine inputs the character into a buffer. This takes a small amount of time. Since, in Color BASIC, software timing is used for all I/O, it is impractical to use interrupts. The other alternative is hardware devices such as ACIA's, which would raise the price of the computer.

CLANG, CLANG, CLANG GOES THE DISK DRIVE

- *Why is there so much grinding and assorted noises on my disk drive (Radio Shack's CoCo 2 drive)? Why, occasionally, do I get the directory quickly with no noise and most often with all that clanging? Is there a remedy for this — a nice short poke to silence it or make it sound like it's not breaking up?*

Why, sometimes, do I get that I/O Error when I load a program that loaded OK five minutes ago, then loads OK five minutes later? I'm so scared of crashed disks and lost programs, that I make at least three backups of every program I save.

By the way, my drive is not broken in any way, and I've experienced this on other drives, too (all the same!).

Barry Hornstein
E. Rockaway, NY

The clattering you are hearing in your disk drives, Barry, is the head inside the drive seeking the proper track.

This also accounts for the fact that you don't hear any noise when asking for a directory. I would bet you just asked for a directory with the previous command. Since all of the information required for the `DIR` command is on Track 17, the heads do not have to move.

The majority of I/O Errors I've encountered on disk systems are caused by dirty contacts between the controller and the CoCo, and speed variations of different disk drives. Since you indicate the program previously loaded, I would suspect dirty contacts. Try cleaning them with a pencil eraser.

I'd like to know where you are buying disks. You must be getting a good price if you can afford to keep three backups of all your programs. Good Luck.

DOWNLOAD DIRECTIONS

- *Is there a manual or a book somewhere that explains the steps to do a download from the Color SIG in CompuServe?*

Michael Smith
Colorado Springs, CO

Michael, the next time you're on the Color SIG, try reading the XA0 database. The last time I was on, it gave a complete description of the various CompuServe download protocols.

If you would like a manual of Special Interest Group (SIG) instructions, ask for a copy of CS-507 from CompuServe. This will not solve your problem, but contains the commands necessary to access the databases.

COCO/M100 WORK TOGETHER

- *I would like to thank you for all your great articles found in THE RAINBOW, and your sister publication, PCM for the M100 owners.*

I have a problem and I need your help. I own a TRS-80 Color Computer 2, 16K ECB and a TRS-80 Model 100. I am considering expanding my CoCo to 64K and adding a disk drive. I would like to know if I can use the disk storage of the CoCo with my M100. I would like to be able to store text files from my 100 on the disk of the CoCo and not use the cassette storage for the 100. Is this possible? If so, how?

Frank Hatchett
Bowling Green, KY

The immediate solution that comes to mind, Frank, is using your Model 100 as a remote terminal for your CoCo. This would require running OS-9 on your CoCo. Files could be stored on your CoCo disk with no problem. The drawback of the setup is speed, since all communications would be at 300 Baud.

Another solution is to use a terminal package on your CoCo and download files as necessary with your Model 100.

UNDOCUMENTED COMMAND

- *I am the owner of a 64K CoCo with Disk BASIC 1.0. When I enter* `COPY ''programname.bas''` *the screen prompts me to enter a destination diskette. Is this an undocumented single drive copy command or an error in Disk BASIC source code?*

Charles Bateman
Independence, MO

Yes, Charles, the single drive `COPY` command is not documented in the Radio Shack manuals. To use it, just type `COPY ''filename/ext''` and follow the prompts.

MIXED UP ABOUT MODEMS

- *I have a 32K CoCo, but I do not have a modem and I am not into electronics — especially computer electronics. I am confused about modems.*

I do not understand why a modem cannot "talk" to any other modem, and thus why a computer equipped with a modem cannot "talk" to any other modem-equipped computer via telephone lines. It is my understanding that a modem converts the electrical signals/information from the computer to which it is attached into signals that can be transported/handled by a telephone receiver line. Or conversely, that a modem converts signals received from a telephone line into those that its computer can use.

If all of the signals handled by telephone lines are the same and the conversions are carried out before or after the signals reach the telephone line, where is the incompatibility?

By the way, with respect to Mark Azar's scrolling problem, using `INKEY$` *instead of* `INPUT` *prompts on the bottom line of the screen allows a user to make lots of wrong responses without the display scrolling up.*

Paulette Grantham
Palo Alto, CA

Thanks for the tip on the use of `INKEY$`, Paulette. The question is hard to answer in a short column, but I will try to give you the basics.

There are several different types of communications protocols available on the telephone lines. The most common is the Bell 103, which defines the frequency of the tones for answer and originate, and the Baud rate, which, by the way, is 300 Baud. This designation just happens to correspond to the data set made by AT&T for this type of protocol. If you buy a Modem I from Radio Shack it follows this standard.

Then, there are 1200 Baud modems. I am aware of two different methods of transmission, tones and phase shift. The most common type of 1200 Baud protocol is the phase shift method, or the Bell 212 standard.

The only thing a modem does is convert the digital information from your computer to tones, so information can be transmitted on normal voice lines.

The incompatibility is introduced both by the protocol of the modem you are using and the information you are exchanging. In most cases it is ASCII text, which presents no particular problems, but some computers (and terminals) use different control codes than others. Then there are buffer control codes such as XON/XOFF handshaking.

It's a wonder any communication is accomplished at all with all of the different variables involved. Don't get discouraged, though; you can talk to almost any other computer you want with your CoCo, given the proper software. Most advanced terminal programs explain the above features as well as make them user-definable. So, if you know what type of computer you want to talk to, it shouldn't be too much of a problem.

Your technical questions are welcomed. Please address them to: Downloads, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We reserve the right to publish only questions of general interest and to edit for space and clarity.

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PERSONABLE PASCAL

Building A Program A Piece At A Time

By Daniel Adams Eastham
Rainbow Contributing Editor

This month we are going to talk about a feature in *DEFT Pascal* which provides you with the ability to develop and compile an individual program in several smaller pieces, rather than as a single, large unit. While this *separate compilation* feature is not part of standard PASCAL, most PASCAL compilers (including PASCAL09, UCSD PASCAL and Microsoft PASCAL for the IBM PC) incorporate a form of it.

There are a number of advantages to developing a program in this manner:

1) You can develop a set of utility routines as a program "piece," and then incorporate that piece into many different programs.

2) You can take a large program with perhaps many sub-systems and make each sub-system a program "piece." This allows you to develop and test each sub-system individually before trying to put the whole thing together.

3) You can let more than one person work on an individual program at the same time by having each one develop his own "piece" of the program.

4) You can use more than one programming language in a single program by having each "piece" written in a different language. With the *DEFT Pascal Workbench*, the languages available are PASCAL and 6809 assembler.

(Daniel Eastham holds a bachelor's degree in computer science and has 14 years experience in systems and communications programming, including work on the original Telenet packet switching network. He is the author of the DEFT Pascal Workbench *and is currently president of Deft Systems, Inc.)*

Modules

The term *module* is used to describe one of these program pieces regardless of which programming language is used to develop it. At the same time, *DEFT Pascal* has a keyword, MODULE, which denotes a particular type of PASCAL module. In *DEFT Pascal* there are two types of modules:

1) A PROGRAM is a module that contains subroutines, variables and the main sequence of instructions to be executed by the overall program.
2) A MODULE is a module that contains subroutines and variables.

A complete program can be made up of one or more modules, but one of these (and no more than one) must be a PROGRAM module. As you can see, every program we have written so far has been developed as a single PROGRAM module.

We already know what the syntax of a PROGRAM module is. The syntax of a MODULE is almost the same:

```
MODULE <identifier>;

  <constant declarations>

  <type declarations>

  <variable declarations>

  <Procedure and Function declarations>

END.
```

The only differences between a MODULE and PROGRAM are that the MODULE does not have any parameters, nor does it have the BEGIN <executable statements> at the bottom like a PROGRAM does.

PUBLIC and EXTERNAL

The purpose of a MODULE is to provide variables, procedures and functions for use by the PROGRAM

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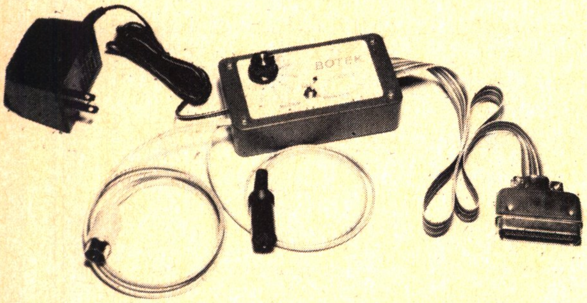

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and other MODULEs. The only problem is how the PROGRAM and other MODULEs reference these variables, procedures and functions. This *linkage* is accomplished via the attributes PUBLIC and EXTERNAL:

1) The PUBLIC attribute identifies those variables, procedures and functions which are defined within the current module (either PROGRAM or MODULE), and which are to be made available to other modules. These variables, procedures and functions then become *publicly* known.
2) The EXTERNAL attribute identifies those publicly known variables, procedures and functions which are defined in other (external) modules, but which are going to be used in this module.

An Example Module

As an example, let's suppose we have a set of routines that prompt for and validate various types of data input from the keyboard. This is how we might construct the MODULE that contains these routines:

> ***"What the compiler does is generate a note to the linker that this module is referencing an item that is present in some other module . . ."***

```
MODULE KeyboardData;

  TYPE Date = RECORD
                Month, Day, Year : Integer;
              END;

  VAR R : Real;
      I : Integer;
      C : Char;

  VAR PUBLIC
      ThisDate : Date;

  PROCEDURE DisplayError;
  BEGIN
    WRITELN ('** ERROR - OUT OF RANGE');
  END;

  FUNCTION GetPercent (Prompt : String) : Real;
  PUBLIC;
  BEGIN
    REPEAT
      WRITE (Prompt, ' (%) ');
      READLN (I);
      IF (I < 0) OR (I > 99) THEN DisplayError;
    UNTIL (I >= 0) AND (I <= 99);
    GetPercent := I / 100;
  END;

  FUNCTION GetYesNo (Prompt : String) : Boolean;
  PUBLIC;
    ...
  END;

  PROCEDURE GetDate (Prompt : String);
  PUBLIC;
    ... (* put result in ThisDate *)
  END;

END.
```

One-Liner Contest Winner . . .

This one-liner converts a decimal number to any base from two through 36. As with hexadecimal, the letters starting with 'A' indicate digits higher than nine, but now the entire range from 'A' to 'Z' is used (hence the limit of 36).

The listing:

```
1 IFB>1ANDB<37ANDB=INT(B)THENM=I
NT(N/B):S=N-M*B:R$=CHR$(-48*(S<1
0)-55*(S>9)+S)+R$:N=M:IFN=0THENP
RINTR$:RUNELSE1ELSEINPUT"NUMBER"
;N:INPUT"BASE";B:IFN<0ORN<>INT(N
)THENB=0:RUNELSE1
```

Donald R. Boyce, Jr.
South Amboy, NJ

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

One-Liner Contest Winner . . .

This one-liner lets you draw a train of dots on the screen. Plug in a joystick (in the right jack) and try it!

The listing:

```
0 POKE65495,0:PCLEAR8:PMODE4,1:P
CLS:PMODE4,5:PCLS:X=198:Y=96:FOR
J=1TO99999:FORI=1TO8:PMODE0,I:SC
REEN1,1:A=JOYSTK(0):B=JOYSTK(1):
X=X-2*(A>60):X=X+2*(A<3):Y=Y-2*(
B>60):Y=Y+2*(B<3):X=X-2*(X<=1):X
=X+2*(X>=255):Y=Y-2*(Y<=1):Y=Y+2
*(Y>=190):PSET(X,Y):NEXTI,J
```

Paul Wagorn
Carp, Ontario

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

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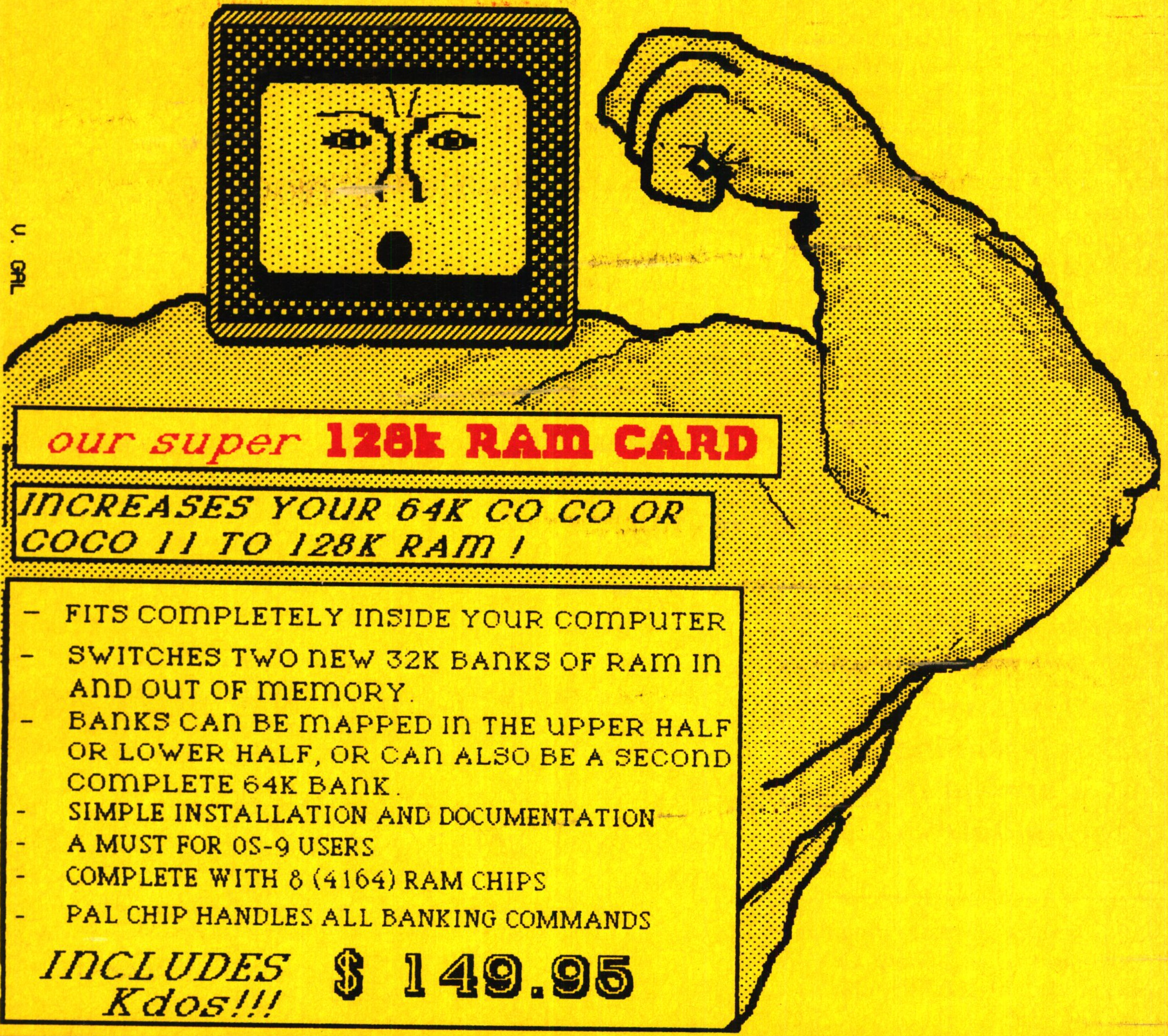

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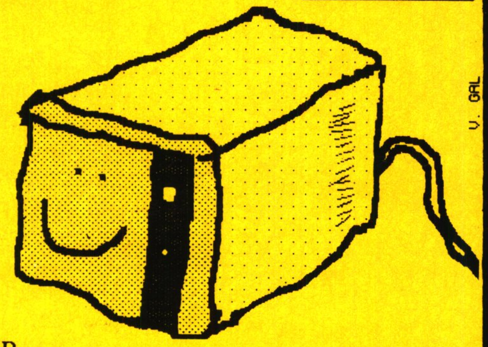

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In this example, we have a number of *private* and *public* variables, procedures and functions. The variables 'R', 'I' and 'C' are all private variables in that they are known only within the module KeyboardData. The variable ThisDate, on the other hand, is a public variable because the VAR statement which declares it has a PUBLIC attribute following it. This means that ThisDate can be accessed by other modules while 'R', 'I' and 'C' cannot.

By the same token, the procedure DisplayError is a private procedure while the functions GetPercent and GetYesNo, as well as the procedure GetDate, are all publicly known. These last three all have the PUBLIC attribute following the FUNCTION or PROCEDURE statement.

Reasons for Choosing PUBLIC

The above declarations have been made for a particular purpose. In this case, the variables 'R', 'I' and 'C' are local work variables for use by all the routines in KeyboardData. There is no reason to allow other modules to access these variables and, by keeping them private, we can ensure that other modules do not inadvertently modify them.

ThisDate, on the other hand, is public because it contains the result of the procedure GetDate. Routines in other modules would invoke GetDate in order to prompt for and validate a date. On return, the resulting date can be accessed from ThisDate.

The routines GetPercent, GetYesNo and GetDate are all publicly known because they represent the purpose of the module to prompt for and validate various types of data from the keyboard. Therefore, these routines will be directly invoked from other modules in order to perform a particular function. The procedure DisplayError has not been publicly declared because it is merely a local utility routine for use exclusively within the module.

The EXTERNAL Part

The next thing to do is access this module from your main program. For example:

```
PROGRAM MyProgram (Input, Output);

  TYPE Date = RECORD
                Month, Day, Year : Integer;
              END;

  VAR EXTERNAL
      ThisDate : Date;

  VAR ...  (* local variables *)

  FUNCTION GetPercent (Prompt : String) : Real;
  EXTERNAL;

  FUNCTION GetYesNo (Prompt : String) : Boolean;
  EXTERNAL;

  PROCEDURE GetDate (Prompt : String);
  EXTERNAL;

  ... (* local procedures and functions *)

BEGIN
  ...
  IF GetPercent ('STARTING PERCENT') > .5 THEN BEGIN
    GetDate ('STARTING DATE');
    IF ThisDate.Year > 1960 THEN ...
  ...
END.
```

In this program, we had to declare the type Date in order to properly declare the external variable ThisDate. Like the PUBLIC attribute, external variables are declared in a VAR statement that contains the keyword EXTERNAL immediately after the keyword VAR.

The routines GetPercent, GetYesNo and GetDate are declared EXTERNAL. Notice that after the declarations of these routines, there is only the word EXTERNAL; there is no body to these routines.

Down in the executable portion of the program, the external variable and routines are used exactly as though they were local to this module.

> ***" . . .all the variables, procedures and functions declared with an interface block are automatically declared as external."***

Linking the Modules Together

All of these external identifiers represent things which are not present in the program module *MyProgram*, but which are present in other modules which will be linked together with *MyProgram* by *DEFT* Linker. Because they are not locally present, the compiler cannot completely generate the required instructions when any of them are referenced by executable statements.

What the compiler does is generate a note to the linker that this module is referencing an item that is present in some other module. Later, when the linker reads in all the modules that are to be linked together, it can determine what PUBLIC identifiers are present and what their addresses are. Then, when the linker encounters one of these notes from the compiler, it can determine what the proper address should be and inserts it at that point in the code to complete the instruction.

INTERFACE Blocks

As you can see, there are a number of lines of code the main program must have in order to allow it to access the module KeyboardData. These lines essentially declare the public *interface* to the module KeyboardData. *DEFT Pascal* contains a second mechanism called an INTERFACE block for specifying the interface to a module. For example, using the INTERFACE block in *MyProgram* would look like this:

```
INTERFACE KeyboardData;

  TYPE Date = RECORD
                Month, Day, Year : Integer;
              END;

  VAR ThisDate : Date;

  FUNCTION GetPercent (Prompt : String) : Real;
  FUNCTION GetYesNo (Prompt : String) : Boolean;
  PROCEDURE GetDate (Prompt : String);

END;
PROGRAM MyProgram (Input, Output);

  VAR ...  (* local variables *)
  ... (* local procedures and functions *)

BEGIN
  ...
  IF GetPercent ('STARTING PERCENT') > .5 THEN BEGIN
    GetDate ('STARTING DATE');
    IF ThisDate.Year > 1960 THEN ...
  ...
END.
```

Using this method, there is no declaration of any of public identifiers (or the required TYPE definition) from the module KeyboardData in the program *MyProgram*. Instead, the entire interface appears to be *predefined*. Notice in the INTERFACE block that there is no use of the keyword EXTERNAL, nor do any of the procedures or functions have bodies. That is because all the variables, procedures and functions declared with an interface block are automatically declared as external.

An INTERFACE block is usually put in a separate source file from any other source file that might need it. A %C compiler directive is then used to include the declarations at the beginning of the file. The standard PASCAL library is declared in exactly this way by always doing an implicit %C on the file *PASCALIB/EXT* at the beginning of any PASCAL program.

Example Program

This month's example program actually consists of two separate listings. The first is an expanded version of our KeyboardData module. It contains the three public routines and variables that we have been using as an example.

The second is a listing of the program *Interest* which computes the total value of an investment. You supply beginning and ending dates, the interest rate, whether it is compounded quarterly (as opposed to yearly) and the initial investment amount. *Interest* uses the routines in KeyboardData in order to prompt for and validate the information that is entered. It also contains a local subroutine, CountDays, that gives an absolute day number to a given date.

You will notice that we used an INTERFACE block to link *Interest* to KeyboardData. The main program then not only used the variable, function and procedure identifiers, but also the type Date which was declared in the interface.

If you have any questions about the separate compilation facilities in *DEFT Pascal*, you can call (301)253-1300 during normal business hours for help. Next month, we will learn about linking *DEFT Pascal* with 6809 assembly language.

If you have a disk system, these commands are needed prior to loading the program:

```
PCLEAR 1
FILES 0,0
CLEAR 16,4999
```

Listing 1

```
00 0000   (**************************************************
00 0000   *
00 0000   *    This module contains a set of routines that
00 0000   *    provide the ability to input and validate
00 0000   *    various types of data from the keyboard
00 0000   *
00 0000   **************************************************)
00 0000
00 0000   MODULE KeyboardData;
00 0000
00 0000   TYPE Date = RECORD
00 0000                 Month, Day, Year : Integer;
00 0000               END;
00 0000
00 0000   VAR R : Real;
00 0006       C : Char;
00 0007       NeedMessage : Boolean;
00 0008
00 0008   VAR PUBLIC
00 0008       ThisDate : Date;
00 000E
00 000E   (**************************************************
00 000E   *
00 000E   *    This Routine displays an error message
00 000E   *
00 000E   **************************************************)
00 000E
00 000E   PROCEDURE DisplayError;
10 000E   BEGIN
11 0012     IF NeedMessage THEN WRITELN ('*** ERROR - OUT OF RANGE');
11 0047     NeedMessage := True;
11 004E   END;

00 0052   (**************************************************
00 0052   *
00 0052   *    This Routine Prompts for percent values
00 0052   *
00 0052   **************************************************)
00 0052
00 0052   FUNCTION GetPercent (Prompt : String) : Real;
10 0052   PUBLIC;
10 0052   BEGIN
11 0056     NeedMessage := False;
11 005C     REPEAT
11 005C       DisplayError;
11 0064       WRITE (Prompt, ' (%) ');
11 0087       READLN (R);
11 009A     UNTIL (R >= 0.0) AND (R <= 100.0);
11 00DA     GetPercent := R / 100.0;
11 00F9   END;

00 00FD
00 00FD   (**************************************************
00 00FD   *
00 00FD   *    This Routine Prompts for Yes/No values
00 00FD   *
00 00FD   **************************************************)
00 00FD
00 00FD   FUNCTION GetYesNo (Prompt : String) : Boolean;
10 00FD   PUBLIC;
10 00FD   BEGIN
11 0101     NeedMessage := False;
11 0107     REPEAT
11 0107       DisplayError;
11 0110       WRITE (Prompt, ' (Y/N) ');
11 0135       READLN (C);
11 0148     UNTIL (C = 'Y') OR (C = 'N');
11 0178     GetYesNo := (C = 'Y');
11 018E   END;
```

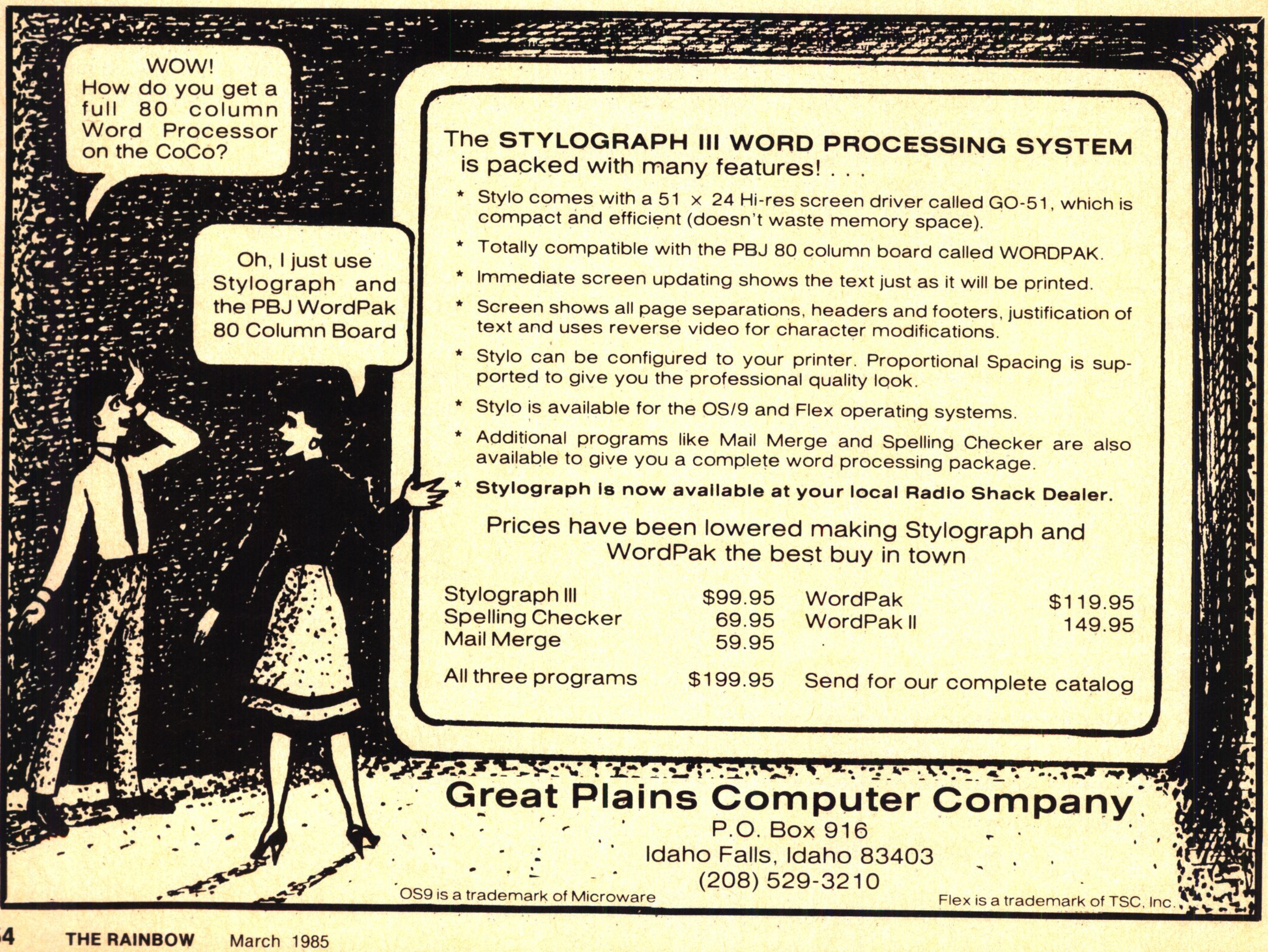
Listing 2

```
00 0192    (****************************************************
00 0192    *
00 0192    *    This Routine Prompts for date values
00 0192    *
00 0192    ****************************************************)
00 0192
00 0192    PROCEDURE GetDate (Prompt : String);
10 0192    PUBLIC;
10 0192    BEGIN
11 0196      NecdMessage := False;
11 019C      WITH ThisDate DO
11 019C        REPEAT
11 019C          DisplayError;
11 01A5          WRITE (Prompt, ' (MM,DD,YYYY) ');
11 01D1          READLN (Input, Month, Day, Year);
11 0205        UNTIL (Month >= 1) AND (Month <= 12) AND (Year > 0) AND
11 0248              (Day >= 1) AND ((Day <= 28) OR
11 0276               ((Day <= 31) AND (Month IN [1,3,5,7,8,10,12])) OR
11 02DA               ((Day <= 30) AND (Month IN [4,6,9,11])) OR
11 0326               ((Day <= 29) AND (Month = 2) AND (Year MOD 4 = 0)));
11 0387    END;

00 0000    (****************************************************
00 0000    *
00 0000    *    This is the interface module for KEYBOARDDATA
00 0000    *    which contains a set of routines that
00 0000    *    provide the ability to input and validate
00 0000    *    various types of data from the keyboard
00 0000    *
00 0000    ****************************************************)
00 0000
00 0000    INTERFACE KeyboardData;
00 0000
00 0000    TYPE Date = RECORD
00 0000                  Month, Day, Year : Integer;
00 0000                END;
00 0000
00 0000    VAR ThisDate : Date;
00 0000
00 0000    FUNCTION GetPercent (Prompt : String) : Real;
00 0000    FUNCTION GetYesNo (Prompt : String) : BOOLEAN;
00 0000    PROCEDURE GetDate (Prompt : String);
00 0000    END;


00 0000    (****************************************************
00 0000    *
00 0000    *    This is an earned interest program
00 0000    *    which computes the total value of an
00 0000    *    investment at the end of a given period of
00 0000    *    time.
00 0000    *
00 0000    ****************************************************)
00 0000
00 0000    PROGRAM Interest (Input, Output);
00 0000
00 0000    VAR FirstDate : Date;
00 0000        Rate      : Real;
00 0000        Years     : Real;
00 0000        Amount    : Real;
00 0000        Periods   : Real;
00 0000
00 0000    FUNCTION CountDays (D : Date) : Real;
10 0003
10 0003    VAR Days : ARRAY[1..11] OF Integer;
10 0003        I    : Integer;
10 0003        Total: Real;
10 0003
10 0003    BEGIN
11 000A      Days[1] := 31; Days[2] := 28; Days[3] := 31; Days[4] := 30;
11 0072      Days[5] := 31; Days[6] := 30; Days[7] := 31; Days[8] := 31;
11 00DA      Days[9] := 30; Days[10]:= 31; Days[11]:= 30;
11 0128
11 0128      WITH D DO BEGIN
12 0128        Year := Year - 1;
12 0139        I := Year DIV 4 - Year DIV 100 + Year DIV 400;
12 0172        Total := Day + I + Year * 365.0;
12 01A4        IF (Year+1) MOD 4 = 0 THEN Days[2] := 29;
12 01E0        FOR I := 1 TO Month-1 DO Total := Total + Days[I];
12 0233        END;
11 0233      CountDays := Total;
11 0242    END;


00 0246    BEGIN
01 024D      Page;
01 0259      WRITELN ('EARNED INTEREST CALCULATION');
01 0286      WRITELN;
01 028E      GetDate ('START');
01 02A6      FirstDate := ThisDate;
01 02B8      GetDate ('END');
01 02CE      Years := (CountDays (ThisDate) - CountDays (FirstDate)) / 365.2425;
01 0317      Rate := GetPercent ('YEARLY RATE');
01 0340      Periods := 1.0;
01 0353      IF GetYesNo ('QUARTERLY?') THEN Periods := 4.0;
01 038C      WRITE ('AMOUNT: ');
01 03A5      READLN (Amount);
01 03B5      WRITE ('FINAL VALUE:', Amount * EXP (LN (1.0 + Rate / Periods)
01 0400                                             * Periods * Years):12:2);
01 0436    END.
```



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XWORD is a powerful word processing system for the Color Computer using OS-9. XWORD is feature packed with only a few features mentioned here.

Some of the editing features of XWORD include: true character oriented full screen editor; works with the normal text screen, XSCREEN, O-PAK, or WORDPAK 80 column card; full block commands with blocks displayed in inverse characters (except with normal text screen) for easy block manipulation; file size not limited to a buffer size; full find and replace commands with wildcard character; able to execute an OS-9 shell command in the middle of editing. Many, many more features, too many to mention here.

Some of the formatting features of XWORD include: proportional spacing supported; perfectly aligned hanging indents and columns, even when using proportional characters; full printer control with control of character size, emphasized, italics, overstrike, underlining (with or without spaces), super and sub-scripts; up to 10 header/footers; page numbering in decimal or Roman numerals; margins and headers can be set differently for even and odd pages; automatically reads printer initialization file to define XWORD for your printer (many included, and easy to write or modify your own). Many more features.

XWORD $79.95

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XSCREEN creates a high resolution screen for the Color Computer using OS-9. This high resolution screen gives you 24 lines of text with 51, 64, or 85 characters per line. Characters can be either white on a black background or vice versa. Easy menu operation.

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KISSable OS-9

An Overview Of Programs, Corrections And More

By Dale L. Puckett
Rainbow Contributing Editor

Back in the old year, we were looking forward to 1985. Yet, the beginning of a new year, like many of life's milestones, often brings us reminders of our human frailties — not to mention much unfinished business.

This year, the reminder about some of the unfinished business came a week or two ago from Dr. Bud Pass, a well-known programmer, writer and owner of Computer Systems Consultants, Inc. in Conyers, Ga. He had sent us the latest version of his *CMODEM* for Color Computer OS-9. He enclosed a short note with the disk to express his concern that we had never mentioned any of his products in "KISSable OS-9."

Dr. Pass sent me a lot of information and copies of his programs earlier in the year. We had intended to pass along an overview of his products for months, but, as with most good intentions, rapidly approaching deadlines, weeks of temporary additional duty and other problems got in the way, and we never had the chance to prepare that overview.

(Dale L. Puckett is a free-lance writer and programmer who has worked with the Motorola family of microprocessors since 1976. He is the author of The Official BASIC09 Tour Guide, *published by Microware and has just completed* The Official Rainbow Guide to OS-9. *He serves on the InfoWorld Software Review Board and is a chief warrant officer in the U.S. Coast Guard.)*

We'll do that first this month. We'll also try to give you a quick overview of a few of the products available from JBM in King of Prussia, Penn.

> ***". . .to help encourage you to jump in and get your feet wet with BASIC09, we'll present two more short procedures written by a beginner."***

We also have some more feedback on Radio Shack OS-9 Version 1.01.00 and more good news about the OS-9 Users Group Software Library. And finally, to help encourage you to jump in and get your feet wet with BASIC09, we'll present two more short procedures written by a beginner.

CMODEM for CoCo OS-9

CMODEM is a communications program for Color Computer OS-9 that lets you receive or transmit files from or to another computer. It lets you use the Ward Christiensen XMODEM file transfer protocol found on CompuServe, Telenet, Newsnet and many CP/M bulletin board systems. The XMODEM protocol places no restrictions on the contents of the files you transmit. Because of this, you can receive pure ASCII text files, binary program files or command files that contain special control characters.

When used in the XMODEM mode, *CMODEM* receives or sends your data in blocks. A special checksum verification routine lets the receiving computer know that it received all the data in a block accurately. If there was static on the telephone line and a block is not transmitted accurately, *CMODEM* tells the other computer that it did not receive the block properly and asks it to send the block again. This process is repeated until the block is received accurately.

CMODEM works well at 1200 Baud

THE OS-9 SOLUTION

by Jeff Francis

A COCO BREAKTHROUGH

Finally! The program that will make OS-9 your favorite CoCo operating system! OS-9 Solution is a program designed to create a "USER FRIENDLY" environment within OS-9. You will forget that you are using one of the most sophisticated and advanced operating systems ever written. This program makes OS-9 easy for everyone from novices to experts! Completely menu driven with prompts at all times. Built in "Help Screens" for run-time help. You may never see the OS-9 command prompt again!

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COMMAND SUMMARY

A - Alphabetize filenames
B - Backup disk
C - Copy file
D - Delete file or directory
E - Examine file
F - Format disk
G - Goto parent directory
H - Help screen
I - Information on a file
J - Jumble around filenames
K - Kompare files
L - Load in a file
M - Make directory
N - New directory (read it)
O - Output file
P - Put together files
Q - Quit OS9 Solution
R - Rename filename
S - Set destination directory
T - Set file attributes
U - Use another disk
V - Verify file
W - Work multiple files
X - Xmode parameters
Y - Display free sectors
Z - Execute shell command

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OS-9 is a trademark of Microware and Motorola on the Color Computer and faster on systems that use an ACIA instead of the bit banger RS-232 port on the rear panel of the CoCo. The standard OS-9 version uses the standard OS-9 path descriptor named /T1, and is compatible with both OS-9 Level I and Level II systems. The Color Computer version contains its own drivers and uses the PIA printer/modem port. *CMODEM* is written in Dyna C and you can purchase the source code. This makes it a very educational as well as useful package.

The program is menu-driven and very easy to use. In fact, you can even run it without looking at the manual. *CMODEM*'s prompts give you all the information you need. You simply pick a letter — or sometimes a number in the submenus. Once you know the program, you can run *CMODEM* in the expert mode which shortens the prompts.

You can modify most of the program's parameters from the menu.

Here are your choices from the main menu:

T: Terminal mode
?: Toggle Expert mode
G: Gather text in memory buffer
V: View text in memory buffer
A: Dump an ASCII file
K: Kill text in memory buffer
E: Toggle Echo mode
M: Modify program parameters
B: Set Baud rate
D: Set delay factor
S: Send a file using XMODEM protocol
R: Receive a file using XMODEM protocol
X: Transfer a binary file using XMODEM protocol
Y: Receive a binary file using XMODEM protocol
Q: Quit
O: Gives you OS-9 prompt (to run a DIR for example) (CLEAR BREAK returns you to *CMODEM*)
H: Hang up phone
F: Flush data collection buffer to file
C: Close text collection file
L: Generate linefeed locally following carriage return

You can return to the selection menu above at any time by holding down the CLEAR key and typing the '@' character.

"OS-9 communications programs that can deal with the bit banging PIA port on the Color Computer have been a long time coming . . . This latest version of* CMODEM *seems to have conquered all the problems."

Make sure you wire your cable correctly if you plan to use *CMODEM* with the Color Computer. *CMODEM* requires the non-standard wiring below:

pins 1 and 2	received data
pin 3	ground
pin 4	transmitted data

When you connect pin 1 and pin 2 together, you generate an interrupt each time you send a character to the port. *CMODEM*'s drivers need this interrupt to function properly.

OS-9 Communications programs that can deal with the bit banging PIA port on the Color Computer have been a long time coming. Every programmer who has tried has run into problems. This latest version of *CMODEM* seems to have conquered all the problems. It worked well and it was fun to use.

Other products written by Dr. Pass include *Super Sleuth*, a disassembler that runs on OS-9, FLEX and UNIFLEX; cross assemblers that run under OS-9 and generate code for the 6800, 6801, 6805, 6502, 8080, 8048, 8045 and Z-80 microprocessors; a program that helps translate 6502 assembler code into 6809 code; and a program that translates position dependent 6800 or 6809 code into position independent code. Many of these programs, especially *Super Sleuth*, have been around for several years and are widely acclaimed.

Now, about JBM

John B. Martin and his programmers have been active in the OS-9 community for several years. After they ran a lot of advertisements for their OS-9 products for the Color Computer early this year, my curiosity got the best of me and I gave them a call. I wound up with so many programs that I was overwhelmed.

In our continuing attempt to clean the slate and start the new year fresh, here's an overview of the JBM Group's OS-9 product line.

LOOKUP and *SLOOKUP* are JBM's answer to the missing metacharacters and wild cards in the OS-9 shell. On MS-DOS and CP/M computers you can type ''DIR *.BAS'' to see a listing of only those programs that have a "BAS" extension. You can do the same thing with many of the UNIX utilities. You can't do it with OS-9's DIR command.

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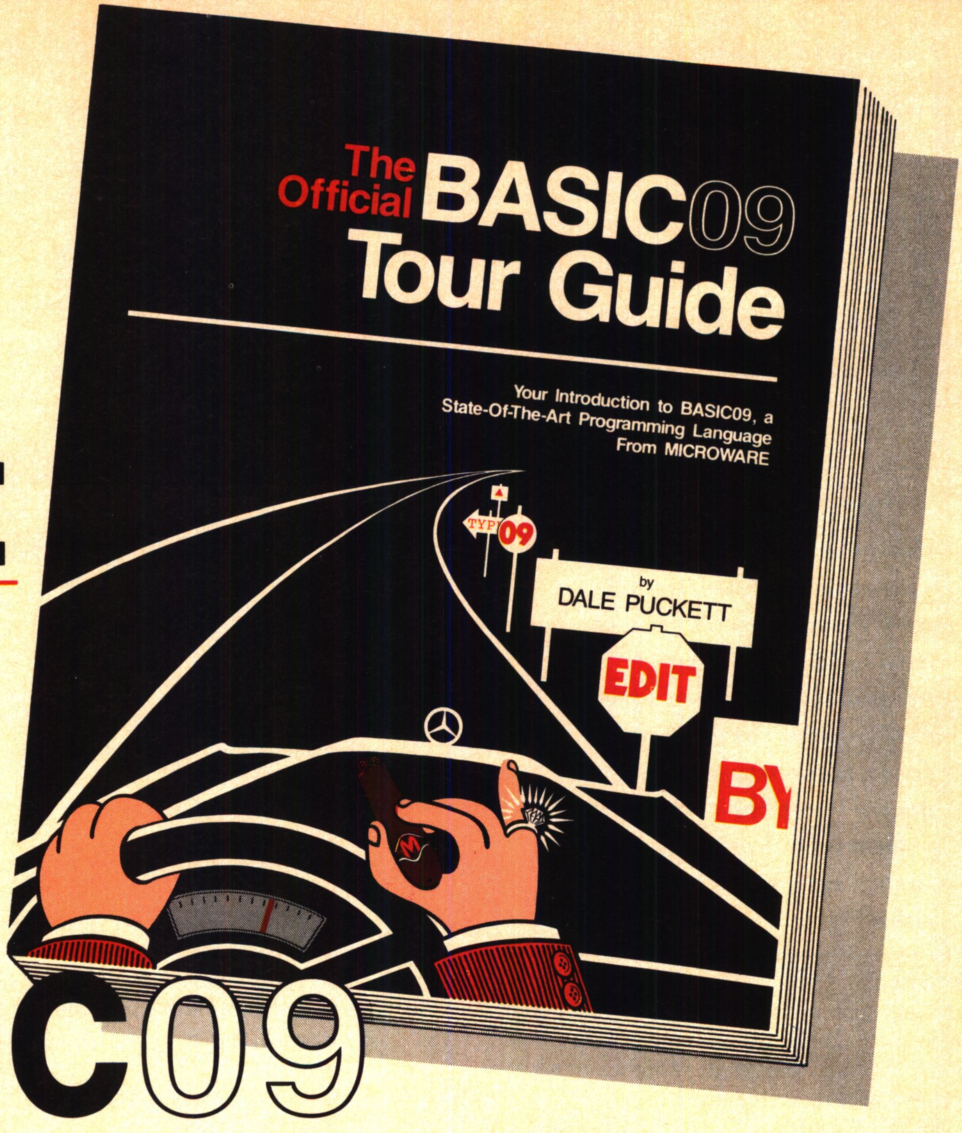
The Official BASIC09 Tour Guide
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To solve the problem, JBM wrote *LOOKUP* and *SLOOKUP* in BASIC09. When you buy the program you receive I-code that runs under *RUNB*. The wild card character, an asterisk, can appear anywhere. *LOOKUP* also lets you search subdirectories for missing files.

SLOOKUP is identical to *LOOKUP*, except its output appears in sorted form. This makes it a very handy tool for organizing your disks. Also, since *LOOKUP* sends its output to OS-9's standard output path, you can easily redirect it to your printer for a hard copy or to a file for future reference.

> ***"When you purchase the new version of OS-9, you must again install any custom drivers you had added to your original version of OS-9. Follow the directions from the software manufacturer that you followed when you installed them the first time."***

And finally, the *LOOKUP/SLOOKUP* package also includes a wild card delete procedure. This procedure prints the name of any file that matches your request and then deletes it.

JBM's *EXAMOD/CHGREV* utilities are two more BASIC09 I-code modules that you install in your working execution directory — usually /D0/CMDS.

You use *EXAMOD* to examine a disk file and determine what type of modules it contains. It reports the module's language, type, size, data storage requirements, revision number, edition and the offset from the beginning of the module to its execution address. Like the LOOKUP package above, *EXAMOD*'s output can be redirected to any device or file on your computer.

CHGREV gives you a shorthand method of changing the version number of BASIC09 I-code or 6809 object code modules in a file. It automatically updates the header parity and CRC of the module after it makes the change for you.

The *LdMac* package from JBM is a group of 6809 object code modules that can be called from BASIC09 to perform a number of tasks that are often required in business programs. Some of these tasks can already be performed from BASIC09 by running the SHELL command. Others could be written directly in BASIC09. However, both of these methods add overhead; either in the form of additional jobs running concurrently on your computer or in extra memory and slower speed.

If you plan to use the routines a lot you can even load them into memory with a command in your *STARTUP* file. They total less than 4K bytes of memory. To save space, we'll define the individual routines that come with *LdMac* in table form.

Routine	**Function**
BFill	Fill a string with spaces
Caps	Capitalize all lowercase letters in a string
CFill	Fill a string with the character you specify
Cmpar	Compare corresponding fields in similar structures
ComCRC	Compute the cyclic redundancy value of a module
FilMgr	Return files' size or position in file
GAtt	Return the attributes of a file
GetID	Return a process number and its User's Number
GMod	Return names of modules linked to BASIC09 module
GPri	Report the priority of a process
HiC	Convert OS-9 strings to BASIC09 strings
InByts	Accept unformatted data from a terminal
Lop	Remove leading spaces from a string
Psit	Position a source string in a target string
SetUID	Change a program's user identification number
Sleeper	Suspend a BASIC09 process temporarily
SPri	Set the priority of a process
Squeez	Remove all spaces from a string
Tctrl	Set characteristics of a terminal
Tnmbr	Report the name of a user's terminal

The *ADLIB* package gives you a way to copy data structures, comments and subroutines from a library file to a source code file. This makes it easier to use the same routines over and over, and eliminates the time wasted when you continue to recode the same routines each time you need them.

ISAM is a package of BASIC09 programs that let you create and use Indexed Sequential Files. It contains three programs and one procedure to let you create, update, review or reorganize your files.

Another JBM package named *XRF* will let you use *ISAM* files that require more than one key. For example, when you are searching through a file containing a list of your employees, you may want to locate an employee's record by name, by payroll number or even by the date he came to work for you. The *XRF* package helps you create the multi-key index you need to do this type of job.

And finally, JBM sells a string arithmetic system that lets you add, subtract, multiply, divide or compare very large numbers accurately. When we say large, we mean 18 digits. It is well-suited for financial applications where accuracy is a must.

In recent months JBM has released three new packages. We haven't seen them, but they look like they could prove useful in a typical office. They are *MESSAGE*, a multi-terminal mail system for OS-9 Level II systems; *CAL*, a personal appointment diary; and *GENUS*, a stand-alone sort program.

Comments about Version 1.01.00

The local Radio Shack in Springfield, Va., finally received their second shipment of Color Computer OS-9 Version 1.01.00 a few days before Christmas. By the time I received my copy, the comments were starting to arrive.

Hawkins of Ladysmith, Wis., reporting that the new version of OS-9 would not work with the *Disk Fix* utility package sold by Computerware. Since at one time or another I have used both Computerware's new *CCDISK* module and D. P. Johnson's *SDISK* package, I was concerned.

Yet, since I knew both packages simply contained replacement modules for the original Radio Shack *CCDISK* module, I couldn't imagine why they wouldn't work. But, rest easy friends. Both packages do work with the new Radio Shack Version 1.01.00. I tried them myself. Then, later I confirmed that other people were using both packages with the new version of OS-9. Bill Brady left a message in one of the databases on CompuServe's OS-9 SIG. Here is a summary of his notes.

"*O-PAK* works the same with the

new *CCIO*. The new version also works fine with *SDISK* and double-sided, double-density disks. It works fine with the PBJ *PC-PAK*, which contains a clock chip and parallel printer port," Brady said.

"The new t2 driver works, but I suggest you set your NULLs=4 to allow X-On and X-Off to work properly. *HiTerm* and other BASIC09 programs execute the same. I've noticed the type-ahead loses *far* fewer characters now. That alone makes it for me." he said.

After receiving Hawkins' letter, I also spoke with Brian Lantz, a free-lance programmer in Tampa, Fla., who authored Computerware's new *DATA BANK* database manager program. He reported that he also has been using both *SDISK* and Computerware's *CCDISK* with Version 1.01.00. This makes me think that a reminder is necessary.

Remember! When you purchase the new version of OS-9, you must again install any custom drivers you had added to your original version of OS-9. Follow the directions from the software manufacturer that you followed when you installed them the first time.

I suspect Hawkins booted up OS-9 with his new Version 1.01.00 disk, and then tried to read a double-sided, 40-track disk he had initialized after installing Computerware's *CCDISK* into Version 1.00.00. Since the *CCDISK* module in the new version of OS-9 is basically the same as the *CCDISK* module in the old version, it still cannot read double-sided disks. Thus, Hawkins found a problem. Again! After you bring your new version of OS-9 to life, don't forget to reinstall any custom modules you have been using.

Along those lines, here's a trick you can use with D. P. Johnson's *SDISK*. If you only own single-sided disk drives and only use *SDISK* to read or write a standard OS-9 disk every once in awhile, you do not need to permanently install *SDISK* in your OS9Boot file — just load the two modules, *SDISK* and *SD1*, when you need them. Once they are loaded into memory, you can use them by naming the standard disk device by name. For example:

```
OS9: dir /SD1  or
OS9: list /SD1/WORK/
a_standard_OS9_file
```

After you have used *SDISK* and *SD1*, be sure to UNLINK them in order to free the memory they use. On the other hand, if you own double-sided drives, you will find it worth your while to go to the trouble of making a new system disk that contains *SDISK* and the related standard OS-9 device descriptors.

Possible Errors in Documentation Changes

While we are on the subject of Version 1.01.00, I should mention that a scan of the new pages 99-102 of the *OS-9 Technical Information Manual* that come with the new disk contain several probable errors. Here are the problems I noticed.

Under "SS.READY": Under the exit conditions, if the carry bit in the 6809's CC register is clear on exit from the routine, then the 6809 B-register should contain a zero. If, on the other hand, the carry bit is set, this indicates there has been an error — and if that error happens to be that the device is not ready, then that B-register should contain $F6, or in mnemonics, E$NOTRDY. It looks like several lines were dropped in editing.

Following "SS.POS": The description for SS.EOF — the test for an end of file condition has been deleted. Don't throw out the pages from your original manual. This description does appear there.

Under "SS.Joy": On Entry, the 6809's B-register should contain $13, not $12 as printed. If you used $12, you would be asking OS-9 for the SS.DSTAT call just above. That's how these things work. The B-register always contains the function code of the function you want to perform. I may not have caught everything. If I missed one let me know, and I'll try to pass it on in the next available column.

And, in case you are wondering about all the excitement created by the new ACIAPAC device driver and /T2 device written to work with the RS-232 cartridge, here's the scoop: "It allows true RS-232 usage on the Color Computer, using a 6551 ACIA instead of the PIA 'bit banger' required if you use the 'RS-232' port on the rear panel. The 'bit banger' requires each bit to be forced through the PIA by software, limiting you to 300 or 600 Baud reliably. The RS-232 hardware pack takes the load off the software, and handles the data as true serial I/O, allowing reliable speeds up to 19,200 Baud!"

If you have a pioneering spirit — and most OS-9 users do — here's another interesting tidbit from the OS-9 SIG. It seems Dennis Bathory Kitsz of RAINBOWfest infamy is designing a "very inexpensive, down-'n-dirty" 68000 computer. He wants to know what you want to see in hardware and software. His CompuServe user number is 70136,1257 if you want to leave him a note. By the way, the comments and demands on that "thread" are unreal!

Listing 1:

```
PROCEDURE dumpm
REM Program to dump a file to either screen or
REM to the printer.
REM In the screen mode, it will display the data
REM 8 across. In the printer mode, it will display
REM 16 across.
REM
REM Version 1.3
REM October 14, 1984.
REM
REM Written by: A. Hoogenraad
REM 4316 Ditzler
REM Kansas City, Missouri 64133
REM
REM
DIM done:BOOLEAN
DIM pathlist,file:STRING
DIM answer:STRING[1]
DIM asciiword(16),path,wordbyte:BYTE
DIM output,word(13),i,max,device,asciicount,hexdump,hexcount:INTEGER

done=FALSE

LOOP

PRINT CHR$(12)
INPUT "<1> Printer    <0> Screen ",output
PRINT
```

OS-9 Users Group Notes

It saddens me to report that Richard Dundon, the editor of *MOTD*, the OS-9 Users Group newsletter, passed away after suffering a stroke on December 8, 1984. Although I had only met Dick in person on one occasion, I talked to him on the phone several times and considered him a good friend. He did an excellent job for the Users Group in the short time that he served.

Fortunately, for the Users Group, Dick's close friend Tim Grovac has volunteered to take over the editor's job — at least until the new officers are elected. If you have news, a program or anything you would like to share with other OS-9 users, please mail it to Tim. Here's his address:

MOTD Publishing
25825 104th Ave. SE
Suite 344
Kent, WA 98031

Also, Tim is looking for an author to take over his BASIC09 column in *MOTD* as he moves on to publish the whole thing. If you are interested, he asks that you send your credentials and a sample of some of your writing to the address above. Give him a hand. More than 750 OS-9 Users Group members receive *MOTD* bi-monthly.

More Software Exchange Disks Available

Dave Kaleita, Software Exchange committee chairman, reports that disk numbers zero through nine, numbers 11 through 14 and number 21 have been completed and are available for your order. Additionally, disk number zero — the one you received free when you joined — and disk number three, a number of word processing utilities, have been improved and carry version numbers of 0.01 and 3.01, respectively.

In the December issue, we gave you the contents of disks zero through 13. Here's the breakdown on disk numbers 14 through 25.

14 — File maintenance utilities
15 — Communications programs
16 — Hardware customizations (drivers and descriptors for non-standard hardware)
17 — BASIC09 programmers toolkit
18 — System utilities
19 — Languages/programming environments (including XLISP)

```
INPUT "Enter the pathlist: ",pathlist
SHELL "dir "+pathlist
PRINT
PRINT "Want another pathlist? ";
GET #0,answer
EXITIF answer="n" OR answer="N" THEN
PRINT
ENDEXIT

ENDLOOP


INPUT "Enter the filename: ",file
pathlist:=pathlist+"/"+file
PRINT CHR$(12)


BASE 0
OPEN #path,pathlist:READ


FOR i:=0 TO 12
GET #path,wordbyte
word(i):=wordbyte
NEXT i


IF output=1 THEN
max:=16
OPEN #device,"/p":WRITE
ELSE

max:=8
device:=0
ENDIF


PRINT #device,"Name:           "; file
PRINT #device,"Size:           ";
PRINT #device USING "h2>"; word(2); word(3)
PRINT #device,"Name offset:    ";
PRINT #device USING "h2>"; word(4); word(5)
PRINT #device,"Start addr:     ";
PRINT #device USING "h2>"; word(9),word(10)
PRINT #device,"Data size:      ";
PRINT #device USING "h2>"; word(11); word(12)


SEEK #path,0

REM print heading

PRINT #device," "
PRINT #device," "
IF output=1 THEN
PRINT #device,"ADDR  0 1 2 3 4 5 6 7 8 9 A B C D E F   0 2 4 6 8 A C E"
PRINT #device,"---- -------------------------------   ---------------"
ELSE

PRINT "ADDR     0 1 2 3 4 5 6 7     0 2 4 6"
PRINT "         8 9 A B C D E F      9 B D F"
PRINT "----    ---------------     --------"
ENDIF


REM main dump routine
hexcount:=0


WHILE NOT(EOF(#path)) DO
GET #path,wordbyte
asciiword(asciicount):=wordbyte
hexdump:=hexdump+1
asciicount:=asciicount+1
IF EOF(#path) THEN
```

20 — Color Computer toolkit
21 — File maintenance disk number two
22 — Programming utilities disk number three
23 — File processing utils disk number three
24 — General interest disk number two
25 — Word processing utils disk number three

The programs for these disks have already been selected and forwarded to other committee members who are assembling the master disks. They should be available by the second quarter.

In December, we gave you a detailed breakdown of the contents of disks zero through five. I just received an alphabetical list of all programs in the Users Group library and their disk assignments. I am organizing it by disk number now and hope to publish it in the April issue.

And, finally, Dr. James Petty, Dr. Robert E. Ringrose and Joseph J. Dubuc — all OS-9 users in the Oklahoma City area — are doing a fantastic

```
done=TRUE
ENDIF

PRINT #device USING "h2>"; wordbyte;


EXITIF hexdump=max THEN
PRINT #device,"     ";

FOR i:=0 TO max-1
IF asciiword(i)>127 THEN
asciiword(i):=asciiword(i)-128
ENDIF
IF asciiword(i)<127 AND asciiword(i)>31 THEN

PRINT #device USING "s1>"; CHR$(asciiword(i));
ELSE

PRINT #device,".";
ENDIF
NEXT i

PRINT #device," "

ENDEXIT

ENDWHILE

EXITIF done=TRUE THEN
PRINT #device," "
ENDEXIT

IF MOD(hexcount,128)=0 THEN
PRINT #device," "
ENDIF
```

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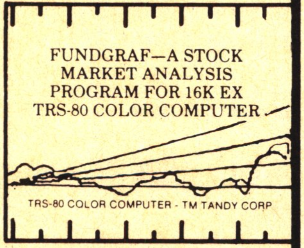
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job with the User Group's membership committee. They have just completed a new database that contains the name and address of each member. Things are looking up for the group.

Here are two BASIC09 utility programs that should help you get your feet wet with BASIC09. They were contributed by Adrianus C. Hoogenraad of Kansas City, Mo. Remember, if you have a short routine you would like to share with other "KISSable OS-9" readers, send it to us at THE RAINBOW. We'll try to get it in as soon as possible.

DUMPM

Adrianus wrote this program before he realized the *OS-9 DUMP* utility had an "-L" option. You can use it to dump a file to the printer or the screen.

When you start it, *DUMPM* asks if you want to dump to the printer or screen. Next, it asks for a pathlist. Here, you enter the pathlist to the directory that contains the file. It will give you a directory of that pathlist and ask you if you want another pathlist.

If you have the right directory, you'll be asked for the name of the file you would like to dump. If you asked for the printer earlier, *DUMPM* will dump out 16 addresses per line. It dumps eight addresses per line on your screen. Both modes display the ASCII values of characters at the end of each line. When the program is finished, it asks you if you want to dump another file.

Del_file

Del_file was just a "fool-around" program designed by Hoogenraad. It gives you another way to delete files from your disks.

This program runs much like *DUMPM*. First, it asks for a pathlist, then displays a directory. It then asks you for the name of the file you would like to delete; after you type the name, it deletes the file and asks if you want to delete another.

These two programs were my first experience with BASIC09. I wanted to write a program with no line numbers, GOTO statements or GOSUB statements. Again, I wrote *DUMPM* because I didn't know the "-L" option was available. If I had known that, I probably wouldn't have written the program, but it was a very good learning experience, anyway.

That's all for March. Have a good month and we'll see what we can cook up for April.

```
ENDLOOP

PRINT #device," "
PRINT #device," "
CLOSE #path

IF output=1 THEN
CLOSE #device
ENDIF

PRINT "Want another dump? "
GET #0,answer
IF answer="y" OR answer="Y" THEN
RUN dumpm
ELSE
ENDIF
END
```

Listing 2:

```
PROCEDURE del_file
REM An alternate to deleting files from your
REM diskettes.
REM
REM Written by:
REM A. Hoogenraad
REM 4316 Ditzler
REM Kansas City, Missouri 64133
REM
REM version 1.0
REM October 14, 1984
REM


DIM answer:STRING[1]
DIM filename:STRING
DIM pathlist:STRING


SHELL "load del"


LOOP
PRINT CHR$(12)
INPUT "Enter pathlist: ",pathlist
SHELL "dir "+pathlist


PRINT "Delete any of these files? ";
GET #0,answer

IF answer="y" OR answer="Y" THEN
PRINT
INPUT "Enter filename:  ",filename
pathlist:=pathlist+"/"+filename
SHELL "del "+pathlist

ELSE
PRINT

ENDIF

PRINT
PRINT "Delete another file? ";
GET #0,answer
EXITIF answer="n" OR answer="N" THEN
SHELL "unlink del"
ENDEXIT

ENDLOOP

END
```

OS-9 UTILITY

RESTORING YOUR OS-9 FILE

Now you can recover that deleted file

By Brian A. Lantz

Ever have something like this happen? Delete the wrong file, thinking you had a readable backup that only produces an I/O Error?

In Extended Color BASIC this has happened to me many times, as it may have to you. Fortunately, a long time ago I figured out how to painfully recover the file(s). If this has happened to you more than once, you may have also.

But what about under OS-9? If you are like most OS-9 users (not just CoCo OS-9 users), you are totally lost when it comes to recovering a deleted file. What's that? You say only a dummy has that happen! Only a beginner!

I can disprove that by using an incident that happened to a friend of mine as an example. This friend is a computer professional from way back. Almost two decades ago he was involved in the development of one of the finest educational languages developed to date. He helped design one of the largest computer installations I have ever seen. What this man doesn't know about computers doesn't need to be known! Surely something like this could not happen to a knowledgeable, computer professional like this, right?

He was in the process of cleaning up his hard disk when someone distracted him. Instead of typing in the entire line, he typed:

```
DELDIR . ENTER
```

Murphy's law took its turn again as he looked at the terminal to see:

```
Deleting directory file
List directory, delete directory, or
quit?
(l/d/q)—
```

(Brian Lantz is a software engineer and consultant. He is the author of OS-9 Textools, OS-9 Databank™, Unicharger *and other software currently on the market)*

Not knowing his previous mistake of an incomplete pathlist, he, of course, typed in a 'D' and entered. So, OS-9 proceeded to delete all the files in his current directory. This directory had the only copies of the source for a new version of a complete new language for OS-9. Before the mistake was noticed, over 16 files were deleted! I promptly received a desperate telephone call to help him out. The happy ending is that we were able to restore 16 out of 16 files, completely!

How to Save Deleted Files

Now for the "how-to" part. How can *you* save those valuable files if they happen to be deleted by mistake or accident?

First, the ideal tool needed: the PATCH utility command. This is available in the *Disk Fix & Utilities* package from Computerware. Other utilities can produce the same results, but I recommend using PATCH for the least work and fastest recovery time. I will explain how to restore files using PATCH, but even if you don't have PATCH, the principles are the same.

Example 1

```
.SP2
   addr  ofst  0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
00000000 0000 00 09 FA 10 01 40 00 01 00 00 03 00 00 FF 1A 9F ..z..@..........
00000010 0010 07 00 10 00 00 00 00 0C 3E 60 54 0A 02 0F 2E 4C ........>'T....L
00000020 0020 65 76 65 6C 20 49 49 20 38 30 20 54 72 61 63 6B evel II 80 Track
00000030 0030 20 53 79 73 74 65 6D 20 44 69 73 EB 00 00 00 01 System Disk....
00000040 0040 01 03 00 03 00 50 02 00 00 10 00 0A 04 0B 00 8E .....P..........
00000050 0050 C0 00 00 00 00 00 00 00 00 00 00 00 00 8F 99 00 @...............
00000060 0060 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
00000070 0070 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
00000080 0080 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
00000090 0090 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000000A0 00A0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000000B0 00B0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000000C0 00C0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000000D0 00D0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000000E0 00E0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000000F0 00F0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
.SP3
.CE
```

Now for a little knowledge of how things are organized on the OS-9 disk. OS-9 doesn't refer to a disk by track number and sector number like most operating systems (i.e., FLEX). OS-9 uses a Logical Sector Number (LSN). The first sector of the disk is LSN 0, followed by LSN 1, etc. This is the way OS-9 can access different types of drives in the same way. No matter how many tracks and sectors it has, LSN 43 is the 44th actual sector of the disk.

> *"A File Descriptor is a one-sector information center for the file; each file has one, including directories. Several things are stored in the File Descriptor sector, including the file's attributes, the file owner's user number, the modification date and creation date, the file size and the segment list."*

The OS-9 directory is a little different from Color Disk BASIC, also. Each directory entry is 32 bytes long. The first 29 bytes are the filename. The last character of the filename has the Most Significant Bit set. The other three bytes are the pointer to the File Descriptor sector of the file.

A File Descriptor is a one-sector information center for the file; each file has one, including directories. Several things are stored in the File Descriptor sector, including the file's attributes (viewed with a `DIR E`), the file owner's user number, the modification date and creation date, the file size and the segment list. The segment list is a table of five-byte entries that tell where the file's sectors are actually located, and how many sectors are in each segment.

End of Basic Training

Now, with the basics out of the way, let's go through the restoration process. The first thing that needs to be done is to enter the PATCH utility. Let's assume for our discussion that the deleted file was named *NEEDED.FILE*, and was located on drive /D0. We would enter the PATCH utility by typing:

```
PATCH /D0@
```

This opens the entire disk located in drive /D0 for patching. The next thing we see is the copyright notice, and the prompt, which looks like this:

```
OmegaSoft Patch utility version 2.20
Copyright 1983 by Certified Software
  Corporation —>
```

The first thing we want to do is locate the root directory for /D0. This information is located in LSN 0, along with several other useful tidbits. To do this, we use the 'D' option of PATCH. This will display in Hex and decimal the bytes requested. If only one number is given on the command line, then 256 bytes are displayed, starting with the byte requested. To display LSN 0, type:

```
-> D 0000
```

The result is Example 1. This is from one of my disks, and is actual output from PATCH. The root directory's File Descriptor sector is located in the eighth, ninth and tenth bytes of LSN 0, which, in this case, is 00 00 03. You will find that, with rare exceptions, the root directory's File Descriptor sector will always be this, but it is wise to check anyway.

In order to find a file, we must look at the File Descriptor, so let's tell PATCH what we want:

```
-> D 00000300
```

Note that we needed two additional zeros at the end. This is because LSNs refer to the number of sectors, not bytes. This PATCH command could have been given as:

```
-> D 0300
```

The result is Example 2. This is a typical File Descriptor sector. (I will not take the space to describe all of what's here, just what concerns this article.) Notice bytes 9 through $0C. These bytes, 00 00 01 20 in this example, are the file size in bytes, not sectors. If we were looking at the File Descriptor of a deleted file, these would all be zeros.

The other important bytes start at offset $10. This is where the segment list table starts. Each segment list entry consists of five bytes. The first three bytes are the Logical Sector Number of the first sector of a block. The remaining two bytes are the length of the block in sectors. The entry following the last valid one must be all zeros. In this case, the LSN is 00 00 04 (or simply 4) and the length of the file in sectors is 00 02. Notice that $0120 bytes become two sectors for the segment list.

Examine Directory

Now it's time to examine a directory. We know that the first segment starts with LSN 4, so we type:

```
->D 0400
```

and now we have Example 3. This is a typical directory listing. In it we find the remains of the *NEEDED.FILE*. As you can see, when a file is deleted in OS-9, the first byte of the filename is changed to a zero. This is the same as with Color Disk BASIC. The rest of the directory entry is left unchanged. This is what helps us to recover the file.

Notice the last three bytes of the entry for *NEEDED.FILE* at offset $04DD-$04DF. These bytes are the LSN of the old file's File Descriptor sector. Unless you have created or edited files since *NEEDED.FILE* was deleted, the data from the file is almost a cinch to find ("almost" will be explained below).

> *"We have fooled OS-9 into believing the file still exists, but the disk's sector map still believes the sectors deleted are available for use. This means the first time a file is created or edited, it could overwrite our recovered file . . ."*

Example 2

```
.SP2
   addr  ofst  0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
00000300 0300 BF 00 00 54 0A 1F 15 1C 02 00 00 01 20 00 00 00 ?..T........  ...
00000310 0310 00 00 04 00 02 00 00 00 00 00 00 00 00 00 00 00 ................
00000320 0320 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
00000330 0330 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
00000340 0340 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
00000350 0350 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
00000360 0360 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
00000370 0370 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
00000380 0380 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
00000390 0390 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000003A0 03A0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000003B0 03B0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000003C0 03C0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000003D0 03D0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000003E0 03E0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000003F0 03F0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
.PG
.SP3
.CE
```

Rather than take all the "fun" out of recovering your first file, I'll just describe most of the rest. The next step is to read the file's File Descriptor sector. Mark down where the File Descriptor is located, since you will need to come back here later on. This part of the segment list is left intact.

When a file is deleted, the first LSN is left in the segment list, but its block size is erased. This, in itself, is not so bad. The trouble is that any other segment list that may have been there originally is erased, also. This is not a problem if the file was in one segment, but if it was fragmented, then you are now on a scavenger hunt to find your

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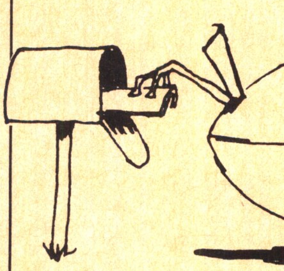

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segments! This is not impossible, it just seems like it is. Under normal circumstances, this should be the exception, not the case.

Normally, the only trick to restoring a file is finding where the file ends, and thus its length. With source files, this is a snap! Once you have the file's length, go back to the File Descriptor sector.

Now you get to use another of PATCH's options, that of modifying bytes on the disk. First, we need to modify the four bytes starting with offset 9 of the sector to tell the Descriptor how long the file really is. Type:

```
->M 5D09
```

if the sector happens to LSN 59, or the appropriate address. Now the address of the byte, along with its current value, is displayed. To change it, enter in the new value. When you are done with the last of the four bytes, enter a '/' (slash) on the next line, and you will return to the normal PATCH prompt. If the length of the fictitious file was $0348, the display will look something like this:

```
->M 5D09
00005D09 00 00
00005D0A 00 00
00005D0B 00 03
00005D0C 00 48
00005D0D 54 /
->
```

Now we must add to the segment list. The file size for the first segment starts at offset $13 of the sector, so we would have this occur:

```
->M 5D13
00005D13 00 00
00005D14 00 04
00005D15 00 /
->
```

Only one thing remains for OS-9 to be able to find the file: We must change the original directory entry. Go back to the directory sector and change the first byte of the filename back to its original value. You can now exit PATCH (with 'Q') and do a `DIR` of /D0, and lo and behold, *NEEDED.FILE* now exists. `LIST` it and see!

We have fooled OS-9 into believing the file still exists, but the disk's sector map still believes the sectors deleted are available for use. This means the first time a file is created or edited, it could overwrite our recovered file with the new file.

Example 3

```
.SP2
   addr  ofst  0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
00000400 0400 2E AE 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
00000410 0410 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 03 ................
00000420 0420 AE 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
00000430 0430 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 03 ................
00000440 0440 4F 53 39 42 6F 6F F4 00 00 00 00 00 00 00 00 00 OS9Boot.........
00000450 0450 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0B ................
00000460 0460 53 59 D3 00 00 00 00 00 00 00 00 00 00 00 00 00 SYS.............
00000470 0470 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 4B ...............K
00000480 0480 53 50 45 4C CC 00 00 00 00 00 00 00 00 00 00 00 SPELL...........
00000490 0490 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 54 ...............T
000004A0 04A0 43 4D 44 D3 00 00 00 00 00 00 00 00 00 00 00 00 CMDS............
000004B0 04B0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 5D ...............]
000004C0 04C0 00 45 45 44 45 44 2E 46 49 4C C5 00 00 00 00 00 .EEDED.FILE.....
000004D0 04D0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 9D ................
000004E0 04E0 44 45 46 D3 00 00 00 00 00 00 00 00 00 00 00 00 DEFS............
000004F0 04F0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 07 C3 ...............C
```

But, don't go away mad! Now, all you need to do is `COPY` this file onto another disk. OS-9 can do that now. It *thinks* the file exists. After copying it onto another disk, you need to remodify the file back to the way you found it, so as not to confuse the operating system.

This may sound like a lot of trouble — well, it is! But so is losing valuable data or programs. Not all files will be worth the trouble, but for the ones that are, this method works exceptionally well. If nothing else, you now have a better understanding of file organization under the OS-9 operating system.

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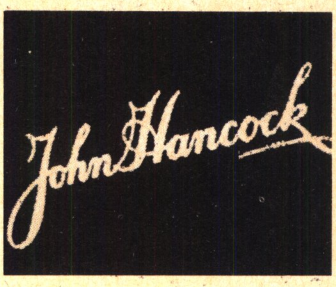

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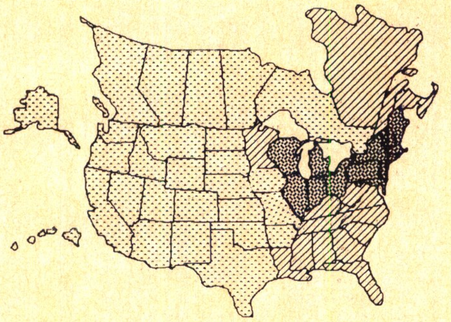

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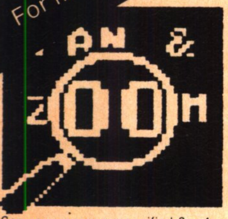
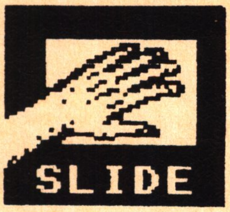
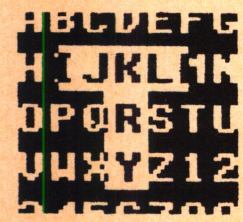


See your screens magnified 2x, 4x, or 8x! Draw or "touch up" in either color or B/W (hi-res) mode. Excellent for fine detail work.



Reposition graphics with precision and ease. "WRAP-AROUND" feature prevents graphics from scrolling off the edge of the screen.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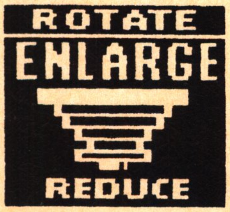
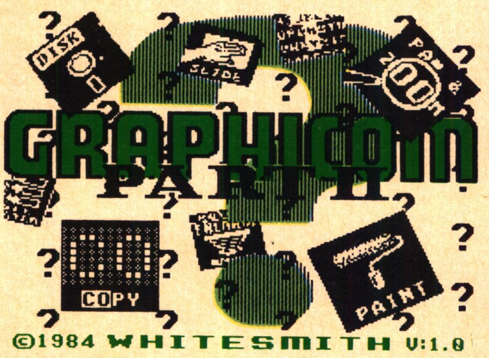
VWXYZ12

Add type in 16 different sizes, over 50 colors of text, characters may be rotated or mirrored to allow typing in almost any direction.


ROTATE
ENLARGE
REDUCE

Enlarge or reduce any part of a screen by any amount, proportional or nonproportional. Rotation can be anything from 0 to 359 deg.


DISK
SLIDE
PAN & ZOOM
GRAPHICOM
PART II
COPY
PAINT
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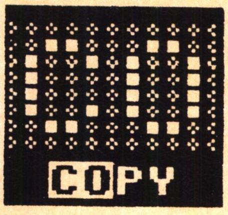
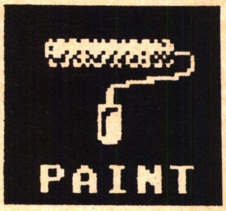
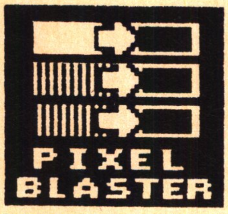
GRAPHICOM PART][is a menu-driven graphics utility that does not require the original GRAPHICOM to run. It includes many of the functions that are missing in GRAPHICOM and will load and save both STANDARD (binary) and GRAPHICOM format screens. GRAPHICOM PART][requires a 64K Color Computer or Color Computer II, and at least one disk drive, It supports 1 to 4 disk drives, keyboard or joystick input, COLOR or B/W (hi-res) operation, and 4 screen display modes. "OOPS" command provides recovery after mistakes, and allows experimenting. Supplied on disk with a 34 page manual.



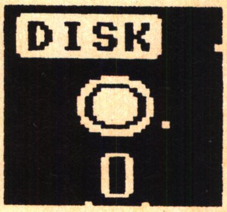
Reproduce and enlarge small areas of the screen with icons or patterns for backgrounds, logos, etc. Over 80 icons supplied on disk (also user-defineable).



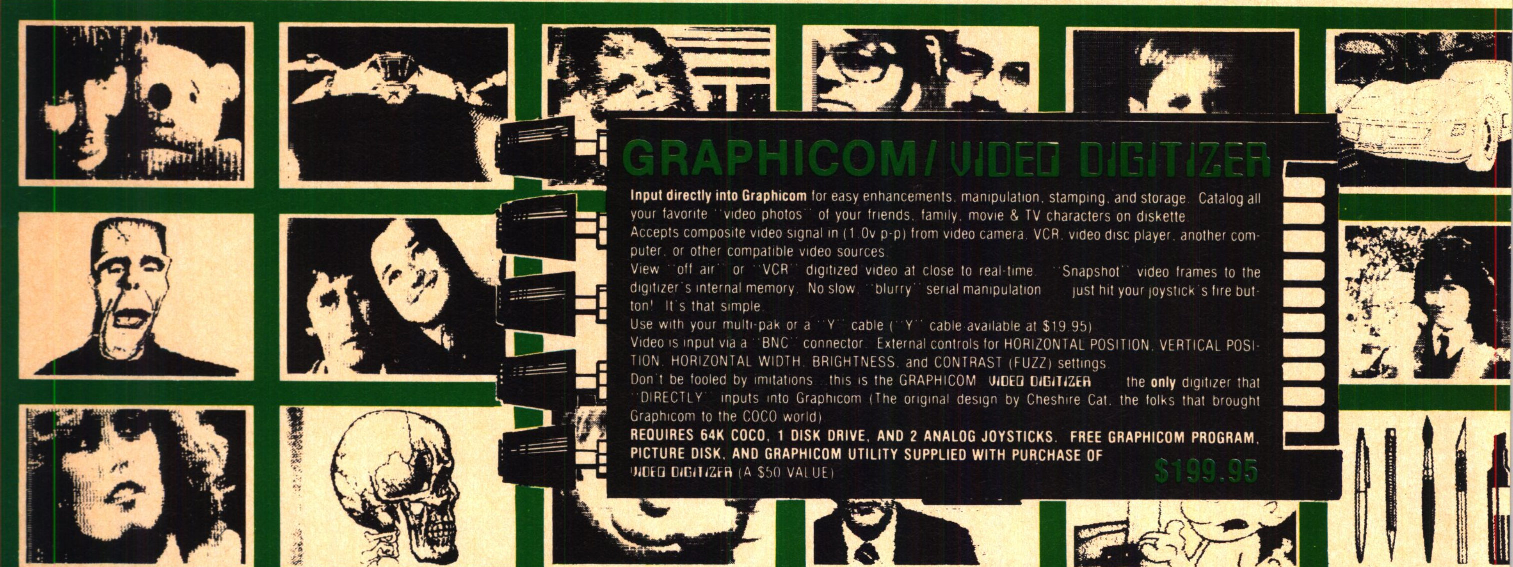
More than 50 different colored shades and patterns available (over 200 if you count the 4 display modes. . .) Additional patterns may be user defined!


PIXEL
BLASTER

Substitute colors, swap BLUE and RED, remove WHITE (removing all color widens lines for painting!), create color separations.



Load & save screens in either GRAPHICOM or STANDARD format, copy screens from one format to another. Supports single or multiple (up to 4) disk drive system.



GRAPHICOM/VIDEO DIGITIZER

Input directly into Graphicom for easy enhancements, manipulation, stamping, and storage. Catalog all your favorite "video photos" of your friends, family, movie & TV characters on diskette.

Accepts composite video signal in (1.0v p-p) from video camera, VCR, video disc player, another computer, or other compatible video sources.

View "off air" or "VCR" digitized video at close to real-time. "Snapshot" video frames to the digitizer's internal memory. No slow, "blurry" serial manipulation just hit your joystick's fire button! It's that simple.

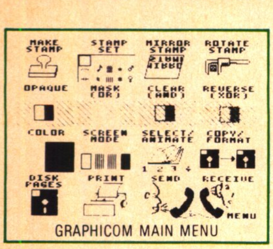
Use with your multi-pak or a "Y" cable ("Y" cable available at $19.95)

Video is input via a "BNC" connector. External controls for HORIZONTAL POSITION, VERTICAL POSITION, HORIZONTAL WIDTH, BRIGHTNESS, and CONTRAST (FUZZ) settings.

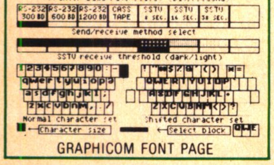
Don't be fooled by imitations... this is the GRAPHICOM VIDEO DIGITIZER the **only** digitizer that "DIRECTLY" inputs into Graphicom (The original design by Cheshire Cat, the folks that brought Graphicom to the COCO world)

REQUIRES 64K COCO, 1 DISK DRIVE, AND 2 ANALOG JOYSTICKS. FREE GRAPHICOM PROGRAM, PICTURE DISK, AND GRAPHICOM UTILITY SUPPLIED WITH PURCHASE OF VIDEO DIGITIZER (A $50 VALUE)

$199.95


MAKE STAMP
STAMP SET
MIRROR STAMP
ROTATE STAMP
OPAQUE
MASK (OR)
CLEAR (AND)
REVERSE (XOR)
COLOR
SCREEN MODE
SELECT/ANIMATE
COPY/FORMAT
DISK PAGES
PRINT
SEND
RECEIVE
MENU

GRAPHICOM MAIN MENU


EPSON
C-ITOH
TANDY
CGP-B
CGP-C
OKI
Printer type select
110
150
300
600
1200
2400
4800
9600
Printer baud rate select (bits/second)
RS-232 300 BD
RS-232 600 BD
RS-232 1200 BD
CASS TAPE
SSTV 8 SEC.
SSTV 16 SEC.
SSTV 38 SEC.
Send/receive method select
SSTV receive threshold (dark/light)
Normal character set
Shifted character set
Character size
Select block

GRAPHICOM FONT PAGE

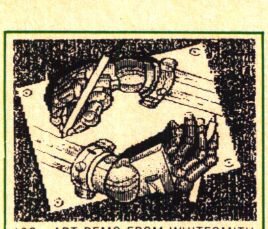
GRAPHICOM $24.95

Simply stated - One of the finest graphic programs written for the Color Computer!

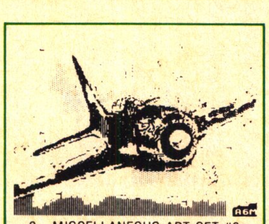
FEATURES:

- U-S-E-R F-R-I-E-N-D-L-Y !
- 4 Display modes (Including Hi-Res red/blue artifact)
- Animate mode
- Color Palette with over 15 color patterns for use with Hi-Res artifact
- Send/Receive pictures over standard modem at 300, 600, or 1200 baud
- Supplied utility allows capturing Hi-Res screens from most COCO arcade games (even protected ones)
- Multiple Hi-Res character fonts (user redefinable)
- Supplied utility for transferring Graphicom screens to Basic or other M/L programs.
- Supplied utility for loading screens from Basic or other sources
- Built in Hi-Res SCREEN PRINT (compatible with EPSON, C-ITOH, GEMINI-10, OKI, plus Radio Shack's LP-VII, LP-VIII, DMP-100, DMP-200, and GCP-115 printers) from 110 to 9600 baud
- Slow-scan television SEND/RECEIVE options
- Many additional features, operating hints, hardware mod's and suggestions, etc.

★ EASY TO LEARN GRAPHIC MENU ★
REQUIRES 64K COCO, 1 DRIVE SYSTEM, AND 2 ANALOG JOYSTICKS



12C - ART DEMO FROM WHITESMITH



8 - MISCELLANEOUS ART SET #2

PICTURE DISKS $9.95

Available from COMPUTIZE

- 4C - Artifact color palette
- 5C - Large character sets drawn with master design (from Derringer Software)
- 6C - Same as 5C but set up as stamp set
- 7 - Miscellaneous Art Set #1
- 8 - Miscellaneous Art Set #2
- 9 - Miscellaneous Ads and Examples
- 10 - Miscellaneous Fonts
- 11C - Artifact color palette type fonts
- 12C - Art demo from WHITESMITH

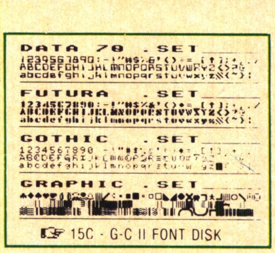
Color Hi-res artworks from Whitesmith, the people that brought you Graphicom Part][, introduced by an animated marching band performing a Sousa march in 4-part harmony!

13C - GRAPHICOM PART II function demo

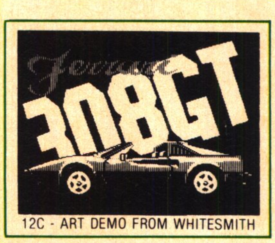
☞ GCII FONT DISKS

Each disk contains 40 or more font files (10 or more GRAPHICOM PART][fonts, 4 versions of each, one for each display mode), and three "FONT INDEX" screens to make identification and selection easy.

- 14C - GCII Fonts Disk #1
- 15C - GCII Fonts Disk #2
- 16C - GCII Fonts Disk #3


DATA 70 .SET
FUTURA .SET
GOTHIC .SET
GRAPHIC .SET

☞ 15C - G-C II FONT DISK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12C - ART DEMO FROM WHITESMITH

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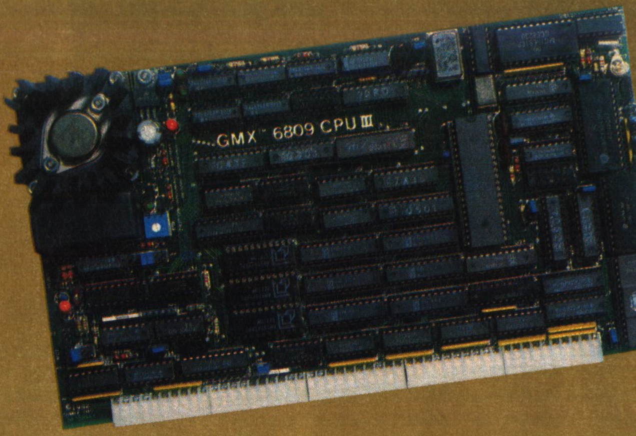
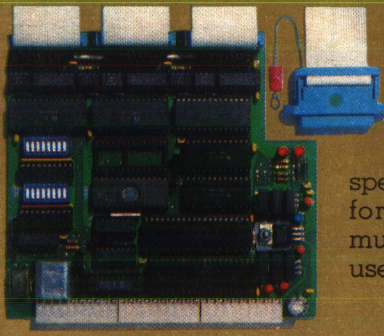
ATTENTION COCO CLUBS
CALL OR WRITE FOR
INFORMATION ABOUT
SOFTWARE DEMOS
FOR CLUBS.

GIMIX STATE OF THE ART 6809 SYSTEMS FOR THE SERIOUS USER.

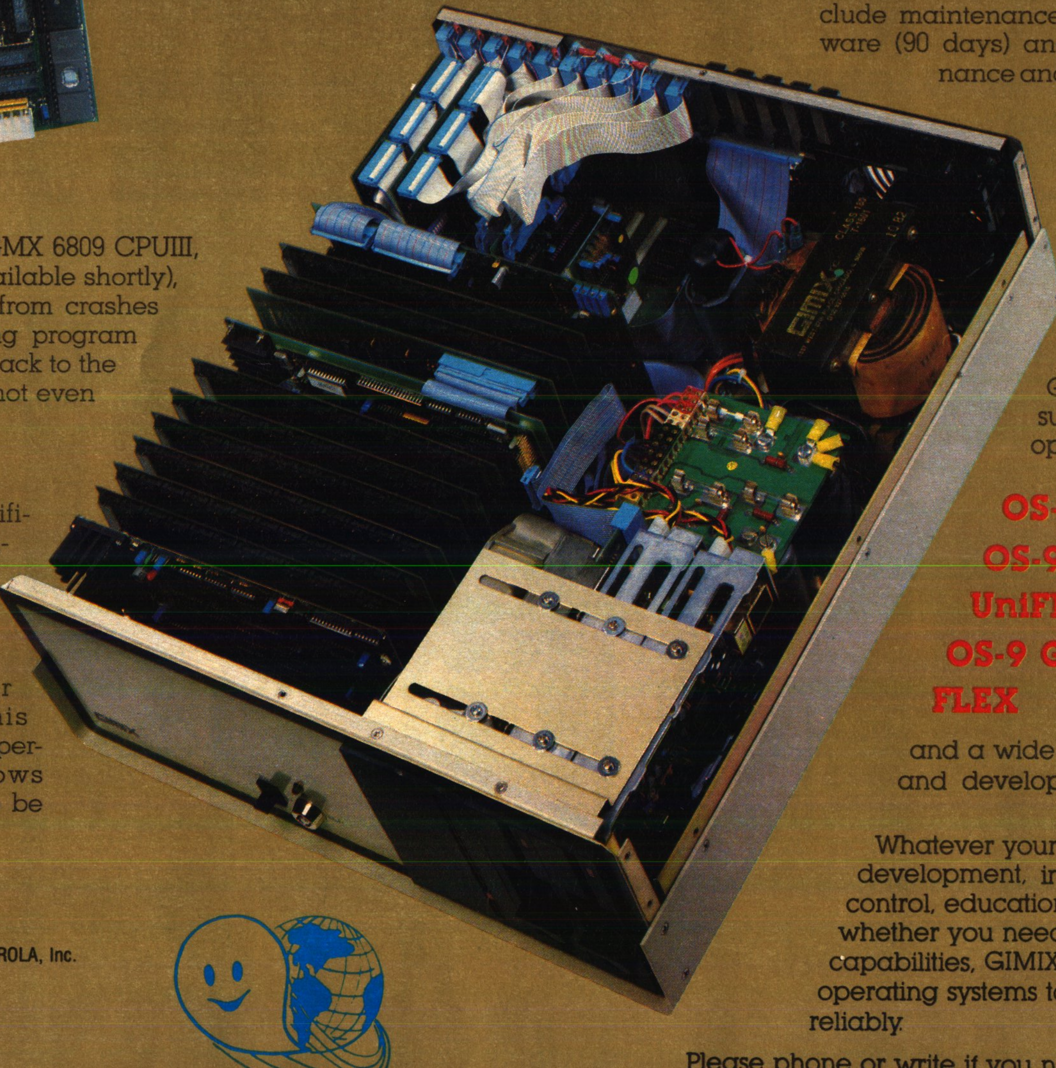


GIMIX has 19MB or high performance 47MB Winchester Drive Systems and/or Floppy Disk Drive Systems.

For the ultimate in performance, the Unique GMX 6809 CPUIII, using either OS-9-GMXIII or UniFLEX GMXIII (available shortly), gives protection to the system and other users from crashes caused by defective user programs. e.g. During program development, a programmer who crashes goes back to the shell or the debugger, while the other users are not even aware anything occurred.



The intelligent serial I/O processor boards significantly reduce system overhead by handling routine I/O functions, thereby freeing up the host CPU for running user programs. This speeds up system performance and allows multiple terminals to be used at 19.2K baud.



For the user who appreciates the need for a bus structured system using STATIC RAM and powered by a ferro resonant constant voltage transformer.

GIMIX has single user systems that can run both FLEX and OS-9 or Multi user systems for use with UniFLEX or OS-9.

GIMIX versions of OS9 and UniFLEX include maintenance and support by Microware (90 days) and TSC (1 year). Maintenance and support after this period are available at extra cost.

(NOTE: this support and maintenance is only for use with approved GIMIX hardware)

GIMIX 6809 systems support five predominant operating systems:

OS-9 GMX III,
OS-9 GMX II,
UniFLEX,
OS-9 GMX I,
FLEX

and a wide variety of languages and development software.

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SPECIFICATIONS: XEX's **SCREEN** has user definable fonts, many of which are supplied. 24 X 51 is the default screen size, but this can be changed to suit the user. Smooth scroll, sideways scroll, invert display, and 4 cursor types are just some of the features. **XEX's KEYBOARD** has user definable keys, supports extra key keyboards, auto key repeat, line editing and command repeat. **XEX DISK DRIVERS** supports all sizes, 35, 40 or 80 track, single and double sided and density. Also supports double stepping so that 40 track disks can be used with 80 track drives. Individual stepping rates for drives are definable. **MODULAR CONSTRUCTION** allows easy modification and changes to **XEX**. It is easy to add or modify the drivers for things like Word-Pak and other hardware, because most of the source is included. **SOURCE IS INCLUDED** for the screen drivers, keyboard drivers, disk drivers, printer drivers, initialization code, other system code, external terminal, and many of the utilities, making modifications simple. It is easy to create your own custom version of **XEX**. Other major packages include **ED,** a powerful screen-oriented line editor. **ASM** is a conditional MACRO assembler. **DBASIC** is Radio Shack Disk BASIC modified to work with **XEX**. **RTF** allows copying text files from RS BASIC to **XEX**. **128K** support is built into **XEX**. **XEX** stands for e**X**tended FL**EX** and is compatible with FLEX, runs all FLEX software and supports all the functions that CC FLEX does, plus the above added features. **XEX** is supplied on three 5-inch disks and has a 3-ring bound manual. The tutorial section gets you up and running with a minimum of hassle or confusion. **XEX** proves that an operating system doesn't have to be complicated to be powerful.

COMPARISION CHART BETWEEN XEX AND OS-9

FUNCTION	XEX	OS9
Hi-Res screen (24X51 default)	YES	NO (O-Pak $34.95)
Supports all disk drives	YES	NO (SDisk w/bootfix $35.95)
User definable keyboard	YES	NO
User friendly, easy to use	YES	NO
Some system source included	YES	NO
Powerful screen like editor	YES	NO (Simple line editor)
Conditional Macro Assembler	YES	NO (No Macro capability)
RS BASIC compatible with DBASIC	YES	NO
Supports 128K upgrades	YES	NO
One disk boot	YES	NO (Yes if you have DOS)
Telephone support	YES	NO
Supports 3rd party hardware	YES	NO

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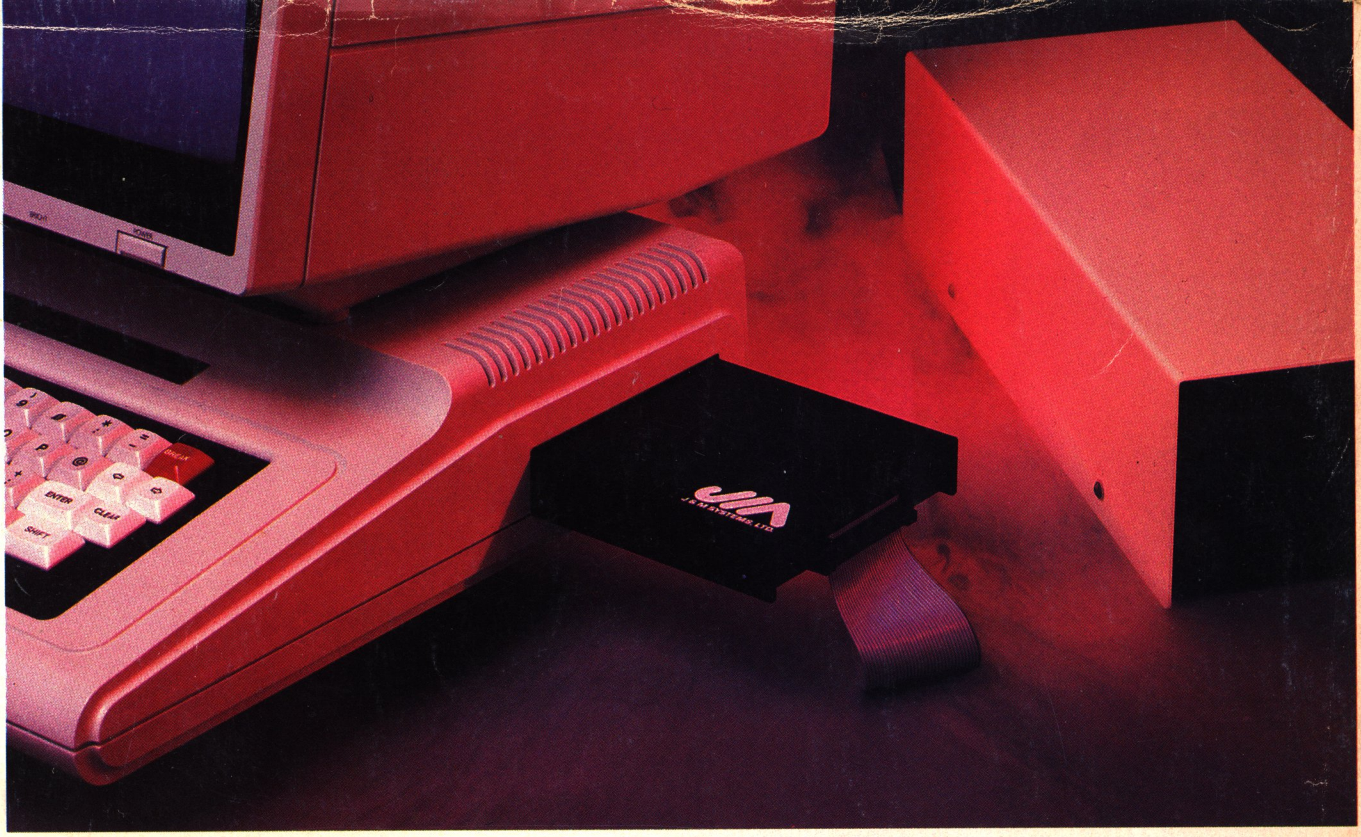

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JFD-COCO DISK CONTROLLER $139

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JDOS implements all RS DOS basic commands, plus many more, including auto line numbering, up and down arrow keys for scrolling, DOS to boot OS/9*, FLEX*, and error trapping. JDOS supports RS compatible disk formats, plus handles 40 track single side and double side drives.

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Memory Minder is a disk drive test program that makes the following major checks of your drives without disassembly or special test equipment: head alignment, disk speed, index hole timing, azimuth, hysteresis, read sensitivity, and clamping. Memory Minder can be used to actually align the drives while viewing the graphics on the screen. This program is a must for anyone who values the data that is saved on diskettes.

MM-COCO-1 Memory Minder for single side drives	$79
MM-COCO-2 Memory Minder for double side drives	$99

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